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About the Metropolitan Area Planning Council

The Metropolitan Area Planning Council is greater Boston's regional planning agency/council of governments. Its membership consists of the chief elected officials from 101 cities and towns; 11 local, regional and state implementing agencies; and 21 gubernatorial appointees representing consumers and minorities. MAPC provides planning assistance in a number of areas including regional economics, natural resources, water quality, transportation, housing, land use, energy and urban design.

The preparation of the *State of the Region* was financially assisted by the cities and towns in the MAPC region and grants from the U.S. Department of Housing and Urban Development, the U.S. Environmental Protection Agency and the U.S. Department of Transportation.

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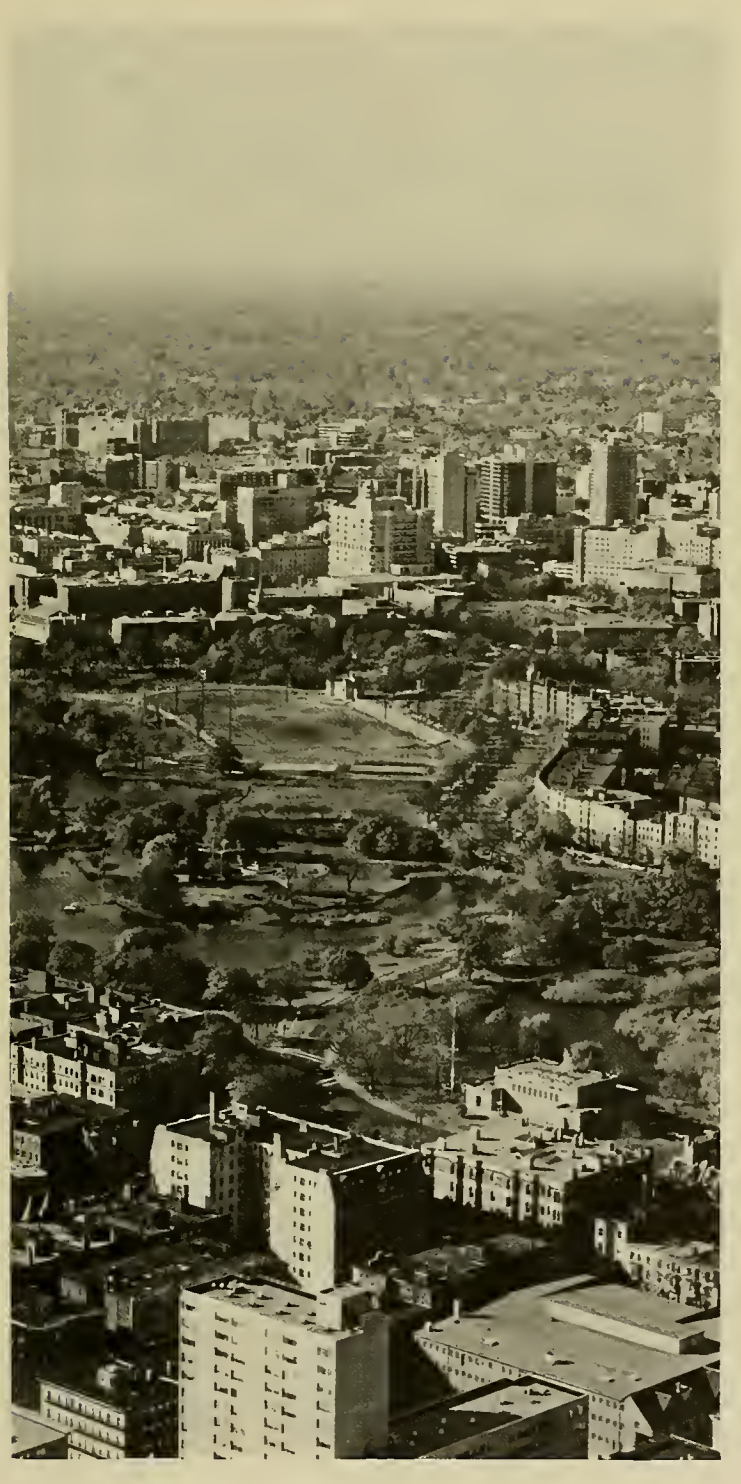


INTRODUCTION

The *State of the Region* is a compendium of resource and reference material which provides statistical information about the metropolitan Boston area. Eleven "quality of life indicators"—people, food, water, housing, economics, taxes, air and noise, transportation, energy, solid waste and sewage, and land use—are examined using data from 30 separate government and private sector sources. Together they provide valuable information about the region never before available in one volume.

Too often limited resources have fallen short of maximum potential because specialists view only their own area and not the larger quality of life opportunities which are possible when specialties combine resources. Regional strategies have surfaced as important to the new federal domestic policy in viewing the nation's large metropolitan areas and in using their resources effectively and not at cross purposes.

Professionals in the fields of finance and banking, planning and consulting, advertising and marketing as well as local officials and interested citizens will find the *State of the Region* a useful overview of past and present trends in the greater Boston region. The reader should be cautioned, however, that no one chapter can be considered entirely "complete"—the sheer volume of information available on some topics has necessitated selection of most relevant information. In areas of recent interest, such as noise pollution, exhaustive data simply does not exist. However, a detailed bibliography, a list of agency contacts and a guide to MAPC resources included at the end of each chapter will direct the interested reader to additional sources of information.

As the regional planning agency representing 101 chief elected officials in the greater Boston area, consumers and minorities in the region and those state agencies with implementing powers in our cities and towns, MAPC is in a unique position to provide a comprehensive statistical profile of these topics of metropolitan concern. In future years this volume will be updated so it can serve as a benchmark for measuring change, assessing progress, and highlighting problems and opportunities for the metropolitan area. This can serve as a means of determining our "regional strategy" and a means of modifying our planning and investment policies. The *State of the Region* does not attempt to analyze data but rather, information is presented for comprehensive multi-issue reference and evaluation by the reader.

The *State of the Region* is just one of the many services provided by MAPC to help the cities and towns and others in the region work cooperatively and effectively toward achieving a metropolitan area where the quality of life offers maximum opportunity for all the persons who live and work here.

1
PEOPLE

"The true test of civilization is, not the census, nor the size of cities, nor the crops—no, but the kind of man the country turns out."

—Ralph Waldo Emerson

Tables 1-1 through 1-6

Population Change in the MAPC Region

These tables provide a detailed look at population change in the MAPC region. The tables, organized according to growth policy subregions, show population change between 1950 and 1975 and the percentage change during each interval and the entire 20 year period. The tables are accompanied by a description of the subregion and its changes over the period.

Table 1-1

Inner 128 Growth Policy Subregion

Although many of the communities in the Inner 128 subregion experienced substantial growth in the 1950-1975 period, and some experienced rapid growth, one-third of the communities lost population, and the total subregion experienced a population decline of 4.4%. In general, the core and some of the inner suburbs lost population, inner suburbs remained stable or gained population, and all of the outer communities gained population.

Those communities with a decline in population, or with only a slowly growing population, have generally experienced an outmigration of family households who moved to suburban locations further out. The elderly and the less affluent have tended to remain in the inner and core communities. Additional immigration to these communities has generally been comprised of lower income households and minority groups, young households, households without children (sometimes affluent), and in some communities, students. It should be noted, however, that even where total population decreased, there has generally been an increase in the number of households, and a greater number of housing units have been necessary to accommodate this increase.

For the communities that grew substantially in population the period of most rapid growth occurred generally in the 1950-1960 period, spurred by the construction of route 128 and the availability of land for single family housing, combined with the pent-up demand for housing, rising incomes, and the availability of financing. This was reinforced after 1960 by the construction and improvement of I-90, I-93, and route 2. The new residents have generally been families of middle and upper middle income with children—with a need and demand for services not already available.

Although the major form of housing development in the 1950-1960 period was the single family house, since 1960 the growing scarcity of available land (particularly in the inner and core communities) and the demand for smaller units which accompanied the change in the age structure of the population and the changes in preferred lifestyle, resulted in the growth of multifamily development as the predominant form of new housing, especially in the core communities and some of the inner suburbs. Rising land costs and building costs—along with land scarcity—have resulted in the construction of housing of substantially higher density than that in existing neighborhoods.

During the 1950-1960 period and continuing to the present, the subregion, and in particular the core communities, suffered a loss of basic manufacturing jobs. The importance of the service sector and office/research/technical jobs increased throughout the subregion(as well as the MAPC region as a whole, and nationally as well), and a substantial number of jobs located in the outer portion of the subregion, particularly along route 128 and connecting highways.

Following the movement of the population, shopping centers proliferated during this period, particularly in the suburban areas, oriented to the automobile, serving large trade areas, and drawing labor force from nearby communities. At the present time the subregion contains relatively little land which is available for new development.

Table 1-1

Population Growth in the Inner 128 Subregion 1950-1975

Community	1950[1]	1960[2]	% Change 1950-1960	1970[3]	% Change 1960-1970	1975[4]	% Change 1970-1975	% Change 1950-1975
Arlington	44,353	49,953	13	53,524	7	50,223	—6	13
Belmont	27,381	28,715	3	28,285	—2	27,660	—2	1
Boston	801,444	697,197	—20	641,071	—8	637,986	—.5	—20
Brookline	57,589	54,044	—12	58,886	9	53,150	—10	—7
Burlington	3,250	12,852	295	21,980	71	24,306	6	648
Cambridge	120,740	107,716	—11	100,361	—7	102,095	2	—15
Chelsea	38,912	33,749	—13	30,625	—9	25,066	—18	—36
Dedham	18,487	23,869	29	26,938	13	26,924	—.1	46
Everett	45,982	43,544	—5	42,485	—2	43,544	6.5	—5
Lexington	17,335	27,691	60	31,886	15	32,477	2	87
Malden	59,804	57,676	—3	56,127	—3	55,814	—.6	—7
Medford	66,113	64,971	—2	64,397	—1	60,702	—6	—8
Melrose	26,988	29,619	10	33,180	12	32,213	—3	19
Milton	22,395	26,375	18	27,190	3	27,214	0	22
Newton	81,994	92,384	13	91,066	—1	89,186	—2	9
Quincy	83,835	87,409	4	87,966	1	91,487	4	9
Revere	36,763	40,080	9	43,159	8	41,292	—4	12
Somerville	102,351	94,697	—8	88,779	—6	80,596	—9	—21
Stoneham	13,229	17,821	35	20,725	16	21,564	4	63
Waltham	47,187	55,413	17	61,582	11	56,757	8	20
Watertown	37,329	39,092	5	39,307	.5	36,075	8	—3
Winchester	15,509	19,376	25	22,269	15	22,672	2	32
Winthrop	19,496	20,303	4	20,885	.2	20,359	.1	4
Woburn	20,492	31,214	52	37,405	20	35,329	—6	72

[1] Source: U.S. Census, 1950.
[2] Source: U.S. Census, 1960.
[3] Source: U.S. Census, 1970.
[4] Source: Massachusetts State Census, 1975.

Table 1-2

North Shore Growth Policy Subregion

Similar to most communities in metropolitan Boston, the communities of the North Shore were originally agricultural settlements. As the Boston region developed into a commercial and industrial center for New England, many of these communities experienced increased residential development. For the North Shore in general, the greatest rate of residential development occurred after World War II, reaching its peak in the mid-1960s and slowing considerably by the the mid-1970s.

While the communities of the North Shore can be generally classified as suburban, there are three exceptions: Gloucester, Lynn and Salem. These three cities were early industrial and commercial centers. Lynn and Salem were textile and shoe manufacturing centers, while Gloucester was an important fishing and trading port. However, industrial and commercial development has stagnated in these cities, and today they can be classified as older industrial/commercial centers attempting to redevelop and revitalize their industrial and commercial base.

Housing patterns in the North Shore are consistent with other suburban areas: predominantly single family detached structures. Multifamily housing exists to some degree in all of the communities but is a higher percentage of the total housing stock in the urban cities and more established suburbs such as Beverly.

Population distribution is similar to housing type distribution in that higher densities occur in the older coastal communities of Marblehead, Salem, Beverly and Gloucester. Other towns like Essex, Wenham and Hamilton have lower populations and population densities. These latter communities, while presently classified as suburban, still have a few visual remnants of their agricultural past.

The North Shore, while it has its own centers of activity, is oriented toward Boston for many services and employment opportunities. When Salem, Lynn and Gloucester were viable commercial/industrial centers there was much less reliance on Boston. However, with the decline of these areas Boston has become the major source of employment opportunities. Residents of the North Shore tend to be commuters. Proportionately few residents work in the town in which they reside.

The North Shore exhibits what can be considered a traditional income pattern for major metropolitan areas with a large proportion of the lower income groups located in urban areas. The suburban areas are generally middle and upper middle income enclaves. Pockets of extreme wealth and poverty do exist; the latter usually located in the urban areas while the former are located in suburban towns and generally associated with the coastline.

Population Growth in the North Shore 1950-1975

Community	1950[1]	1960[2]	% Change 1950-1960	1970[3]	% Change 1960-1970	1975[4]	% Change 1970-1975	% Change 1950-1975
Beverly	28,884	36,108	25	38,348	6	37,382	3	29
Danvers	15,720	21,926	40	26,151	19	25,007	—4	59
Essex	1,794	2,238	25	2,670	19	2,872	8	60
Gloucester	25,167	25,789	3	27,941	8	27,209	—3	8
Hamilton	2,764	5,488	99	6,372	16	6,675	5	142
Ipswich	6,895	8,544	24	10,750	26	11,551	8	68
Lynn	99,738	94,478	—5	90,294	—4	80,240	—11	—20
Lynnfield	3,927	8,398	114	10,826	29	12,009	11	206
Manchester	2,868	3,932	37	5,151	31	5,542	8	93
Marblehead	13,765	18,521	35	21,295	15	21,574	1	57
Middleton	2,961	3,718	28	4,044	9	4,032	—.3	38
Nahant	2,679	3,960	48	4,119	4	4,229	3	58
No. Reading	4,402	8,331	89	11,264	35	12,129	8	175
Peabody	22,645	32,202	42	48,080	49	45,503	—5	101
Reading	14,006	19,259	38	22,539	17	23,696	5	69
Rockport	4,231	4,616	9	5,636	22	6,284	12	49
Salem	41,880	39,211	—6	40,556	34	38,545	—5	—8
Saugus	17,162	20,666	20	25,110	22	24,716	—2	44
Swampscott	11,580	13,294	15	13,578	2	14,329	6	24
Topsfield	1,412	3,351	137	5,225	56	5,913	13	319
Wakefield	19,633	24,295	24	25,402	5	26,041	3	33
Wenham	1,644	2,789	59	3,849	73	3,358	13	104
Wilmington	7,039	12,475	77	17,102	37	17,656	37	151

1 Source: U.S. Census, 1950.
2 Source: U.S. Census, 1960.
3 Source: U.S. Census, 1970.
4 Source: Massachusetts State Census, 1975.

Table 1-3

South Shore Growth Policy Subregion

The South Shore subregion has undergone tremendous growth since 1950. Without exception the population of all communities has risen steadily over the past 25 years ranging from an increase of 59.0% in Braintree to a dramatic rise of over 495.3% in Marshfield.

The overall attractiveness and location of the subregion has made it a desirable residential location. The steady rise in population has resulted in a correspondingly steady expansion of housing units. Most of this construction has been single family homes on relatively large lots, yet a significant increase in multifamily units has also occurred recently (notably in Weymouth).

In addition to this general process of suburbanization, several specific factors have contributed to the rapid growth of the region. One major growth factor which is frequently mentioned by the towns is the recent construction of major highways in the region, notably route 3, route 24 and route 128. These heavily travelled highways link the South Shore region to Boston and the North Shore, to Cape Cod and the southern and western areas of New England via route 95 and the Mass. Pike. Interchanges (for example those at Norwell and Hanover and route 3) have been subject to rapid and substantial commercial and light industrial growth.

The impact of growth, according to the communities, has been mixed. On the one hand, many towns cite familiar growth related problems including an increased need for municipal services with a consequent strain on municipal finances, increased property taxes, and inadequate facilities for waste disposal. Growth is not seen in a totally negative light, however. Several communities indicate that recreational and environmental amenities have been enhanced over recent years, resulting perhaps from a new awareness of the value of open space in light of intensified growth pressures. Although all towns point to some specific growth related problems, several towns state that growth has resulted in a better overall town environment (Duxbury) and a more affluent community (Norwell).

The rapid increase in residential units has not generally been complemented by a similarly dramatic rise in the amount of industrial or commercial development. The construction of the major highways mentioned above has stimulated moderate industrial and commercial development in scattered locations (e.g. shopping centers and light industrial parks); several communities, however, express concern regarding the loss of important industries over recent years.

The towns in the South Shore subregion view past growth from different perspectives and with mixed feelings. A general consensus is clear however: future growth must be carefully managed if undesired impacts are to be avoided.

Population Growth in the South Shore 1950-1975

Community	1950[1]	1960[2]	% Change 1950-1960	1970[3]	% Change 1960-1970	1975[4]	% Change 1970-1975	% Change 1950-1975
Braintree	23,161	31,609	37	35,053	11	36,822	5	59
Cohasset	3,731	5,840	57	6,958	19	7,785	12	109
Duxbury	3,167	4,727	49	7,636	62	10,601	39	235
Hanover	3,389	5,923	75	10,107	71	10,533	4	211
Hingham	10,665	15,378	44	18,823	22	19,544	4	83
Holbrook	4,004	10,104	152	11,775	17	11,849	1	196
Hull	3,379	7,055	109	9,946	41	10,572	6	213
Marshfield	3,267	6,748	107	15,223	126	19,450	22	495
Norwell	2,515	5,207	107	7,796	50	8,999	13	258
Pembroke	2,579	4,919	91	11,193	128	12,374	10	380
Randolph	9,982	18,900	89	27,035	43	29,206	7	193
Rockland	8,960	13,119	46	15,715	20	17,028	8	90
Scituate	5,993	11,214	87	16,973	51	17,829	5	198
Weymouth	32,690	48,177	47	54,569	13	56,854	4	74

[1] Source: U.S. Census, 1950.
[2] Source: U.S. Census, 1960.
[3] Source: U.S. Census, 1970.
[4] Source: Massachusetts State Census, 1975.

Table 1-4

Western Growth Policy Subregion

The Western subregion consists of 14 towns lying due west of Boston between the two major circumferential highways, route 128 and route 495. The Massachusetts Turnpike runs east-west through the center of the subregion. The land is mostly flat, with some lakes and ponds and extensive wetland areas. The Charles and Sudbury rivers and other smaller streams run through the subregion.

The towns range from predominantly urban to predominantly rural. Framingham, the largest town in the state, is a subregional urban and economic center. The inner towns are clearly suburbs of Boston. The outer towns could be called "exurbs" of Boston. A few towns around Framingham are suburbs of Framingham to some extent.

The growth of the subregion has been shaped to a great extent by its regional highways. In the 1950s route 128 and its employment opportunities produced growth pressures, particularly on the inner towns. The Massachusetts Turnpike and route 495 followed with similar effects. The inner towns have gone through a growth cycle, and their rate of growth is now slow. The rest of the subregion is still experiencing population growth, particularly near route 495. Many towns have more than doubled in population since 1960.

This growth has led to changes in the character of most of the towns. It has created specific problems of traffic, services, water supplies, water quality, wastewater disposal, solid waste disposal, and preservation of open and agricultural land. It has also provided housing and job opportunities for thousands of families and individuals. In most of the towns, the problems associated with past growth are recognized, and there is great concern for limiting and controlling future growth. Open space and rural character are greatly valued by the people of the subregion and they are determined to safeguard what is left of the rural past and the natural environment.

Population Growth in the Western Subregion 1950-1975

Community	1950[1]	1960[2]	% Change 1950-1960	1970[3]	% Change 1960-1970	1975[4]	% Change 1970-1975	% Change 1950-1975
Ashland	3,500	7,779	122	8,882	14	8,906	0	154
Framingham	28,086	44,526	59	64,048	44	65,564	2	133
Holliston	3,753	6,222	66	12,069	94	12,921	7	244
Hopkinton	3,486	4,932	41	5,943	20	6,405	8	84
Hudson	8,211	9,666	18	16,084	66	16,827	5	105
Marlborough	15,756	18,819	19	27,936	48	30,249	8	92
Milford	15,442	15,749	2	19,352	23	23,366	21	51
Natick	19,838	28,831	45	31,057	8	31,102	0	57
Sherborn	1,245	1,806	45	3,309	83	4,116	24	231
Southborough	2,760	3,996	45	5,798	45	6,326	9	129
Sudbury	2,596	7,447	187	13,506	81	14,951	11	476
Wayland	4,407	10,444	137	13,461	29	13,282	—1	201
Wellesley	20,549	26,071	27	28,051	8	26,593	—5	29
Weston	5,026	8,261	64	10,870	32	11,478	6	128

1 Source: U.S. Census, 1950.
2 Source: U.S. Census, 1960.
3 Source: U.S. Census, 1970.
4 Source: Massachusetts State Census, 1975.

Table 1-5

Southwest Growth Policy Subregion

The Southwest subregion is still relatively undeveloped for the Boston area. It was originally settled as clusters of small manufacturing centers surrounded by farms. Since the development of the current highway system (routes 128 and 24, Interstate 95 and 495) it has, for the most part, received much more residential development than industrial development. Consequently, it is one of the fastest growing sections in the Boston metropolitan area. For instance, while from 1960 to 1970 the MAPC region had an 8% increase in population, the Southwest subregion had a 35% increase in its population. The Southwest area, defined for this study, contains 16% of the communities in the region and in 1960 it only had 6% of the region's population. Yet through the 1960s 26.6% of the increase in the region's population occurred in this area.

Table 1-5 illustrates population in the subregion for the years 1950, 1960 and 1970. While the rate of increase in population declined from 53% for 1950-1960, to 35% for 1960-1970, the subregion's population increased by approximately 60,000 persons each decade. Current building permit data indicates that the Southwest has continued to maintain this level of growth.

Population Growth in the Southwest Subregion 1950-1975

Community	1950[1]	1960[2]	% Change 1950-1960	1970[3]	% Change 1960-1970	1975[4]	% Change 1970-1975	% Change 1950-1975
Bellingham	4,100	6,774	64	13,967	106	14,461	4	241
Canton	7,465	12,771	71	17,100	34	18,114	6	129
Dover	1,722	2,846	65	4,529	59	4,923	9	163
Foxborough	7,030	10,136	44	14,218	35	14,690	4	102
Franklin	8,037	10,530	31	17,830	69	18,379	3	122
Medfield	4,549	6,021	32	9,321	63	10,031	2	105
Medway	3,744	5,168	38	7,938	54	8,166	3	112
Millis	2,551	4,374	68	5,686	30	6,534	15	123
Needham	16,313	25,793	58	29,748	15	29,936	1	83
Norfolk	2,704	3,471	28	4,656	34	5,960	28	72
Norwood	16,636	24,898	50	30,815	24	31,316	2	85
Sharon	4,847	10,070	108	12,367	23	13,592	10	155
Stoughton	11,146	16,328	46	23,459	44	25,717	10	110
Walpole	9,104	14,068	54	18,149	29	18,504	2	99
Westwood	5,873	10,354	77	12,750	23	14,019	10	118
Wrentham	5,341	6,685	25	7,315	9	7,342	.4	37

1 Source: U.S. Census, 1950.
2 Source: U.S. Census, 1960.
3 Source: U.S. Census, 1970.
4 Source: Massachusetts State Census, 1975.

Table 1-6

Northwest Growth Policy Subregion

Table 1-6 describes what has been locally perceived as rapid population growth since World War II in the Northwest subregion. The preservation of much of the natural and historical heritage of the area is remarkable in the face of rapid population growth and suburban development in the past 25 years. With few exceptions, growth in population and overall development has been continuous during this period.* The principal factors which have caused this growth are:

1. Suburbanization in general with the natural outward expansion of population and development from Boston, Lowell and to a small degree Worcester.
2. Major highway construction and expansion, particularly routes 128, 495, 2 and 3.
3. The unprecedented development of the electronics and related industries associated with route 128.
4. The opening of Hanscom Field, and the defense-related industrial development associated with that facility.
5. The opening and continued operation of Fort Devens Army Base in Ayer.

Variations in the pace of growth by town and by decade are the result of events (highway construction, etc.) having occurred at different times. For example, the rapid residential growth in the towns of Bedford, Concord, and Lincoln was influenced by the construction of route 128 in the late 1940s and early 1950s. The steady residential growth in Littleton, Boxborough and Acton, especially apartment development, is a result of the combination of most of the influences listed above, particularly Fort Devens and the construction of I-495.

While most towns in the Northwest have experienced significant population growth, the same is not true of commercial and industrial growth. Non-residential growth during the past 25 years has been restricted to the towns of Bedford (electronics industry associated with route 128 and Hanscom Field), Acton (shopping centers associated with the rapid residential development of apartment complexes), and Maynard (historically an industrial town enjoying a recent "revival" because of the Digital Corporation). Lincoln, despite or perhaps because of its location in the midst of expanding commercial and industrial development (in Waltham, Bedford, Burlington), has avoided this growth in large part due to early decisions to prohibit or severely limit such growth. Route 128-style industrial growth has not as yet occurred along route I-495 as had been anticipated. (This appears to be due largely to the lack of economic expansion state-wide in the period since the construction of this interstate.)

Qualitatively, residential growth has been primarily in middle and upper middle income housing. Newcomers have been generally affluent and attracted to large single-family homes on large lots. While significant apartment development has occurred in Acton and Boxborough, few of these units are affordable to lower income families. Industrial development has been largely research and development, with manufacturing restricted to high value-added products. Employment in such industries reflects the general affluence of the area.

The economic conditions caused by continued suburbanization has been a factor in the dramatic decline of farming activities in the subregion.

* The exception is Maynard, whose small land area (5.35 sq. mi.) had already been significantly developed by 1950.

Population Growth in the Northwest Subregion 1950-1975

Community	1950[1]	1960[2]	% Change 1950-1960	1970[3]	% Change 1960-1970	1975[4]	% Change 1970-1975	% Change 1950-1975
Acton	3,510	7,238	106	14,045	94	18,209	30	419
Bedford	5,234	10,969	110	12,585	29	12,314	—2	135
Bolton	956	1,264	32	2,015	59	2,427	20	154
Boxborough	439	744	69	1,528	105	2,642	73	502
Carlisle	876	1,488	70	2,929	97	3,178	9	263
Concord	8,623	12,517	45	16,693	33	17,270	3	100
Lincoln	2,339	3,912	67	4,463	14	4,851	9	107
Littleton	2,349	5,109	117	6,342	24	6,629	5	182
Maynard	6,978	7,695	10	9,590	25	9,901	3	42
Stow	1,700	2,573	51	3,986	55	4,688	18	176

1 Source: U.S. Census, 1950.
2 Source: U.S. Census, 1960.
3 Source: U.S. Census, 1970.
4 Source: Massechusetts State Census, 1975.

Table 1-7

School Enrollment in MAPC Region

A comparison between school enrollment figures for 1970-71 and 1973-74 generally follow population growth trends for the MAPC region. Older communities like Chelsea, Boston and Cambridge experienced declining school enrollment during the period, while outer suburbs like Boxborough, Pembroke and Southborough gained enrollment.

Community	1970-71	1973-74
Acton	2,415	2,713
Arlington	9,607	8,886
Ashland	2,439	2,379
Bedford	3,883	3,947
Bellingham	3,462	4,132
Belmont	4,775	5,012
Beverly	8,213	8,339
Bolton	349	442
Boston	96,863	93,299
*Boxboro	235	295
Braintree	9,904	9,068
Brookline	6,827	6,133
Burlington	7,132	7,688
Cambridge	10,148	9,946
Canton	3,860	4,499
*Carlisle	586	619
Chelsea	4,957	4,457
Cohasset	1,910	1,950
Concord	3,313	2,991
Danvers	5,615	5,698
Dedham	6,250	6,194
*Dover	618	582
Duxbury	2,349	3,002
Essex	444	403
Everett	7,461	6,856
Foxboro	3,569	3,938
Framingham	15,264	14,831
Franklin	4,484	5,516
Gloucester	5,795	6,109
*Hamilton	1,368	1,243
Hanover	3,115	3,375
Hingham	5,388	5,441
Holbrook	2,776	2,884
Holliston	3,463	3,780
Hopkinton	1,629	1,722
Hudson	3,664	4,066
Hull	3,080	3,001
Ipswich	2,773	2,583
Lexington	9,458	8,754
Lincoln	990	887
Littleton	1,804	1,806
Lynn	15,642	15,189
Lynnfield	2,976	3,232
Malden	10,186	10,212
Manchester	1,200	1,287
Marblehead	4,493	4,643
Marlboro	6,589	6,655
Marshfield	4,432	5,627
Maynard	2,084	1,991
Medfield	2,620	2,875
Medford	11,084	11,180
Medway	2,602	2,596
Melrose	7,535	6,783
*Middleton	604	673
Milford	3,203	4,519
Millis	1,752	1,750
Milton	4,421	4,440
Nahant	687	677
Natick	8,635	8,142
Needham	7,587	7,364
Newton	17,790	16,570
*Norfolk	621	790
N. Reading	3,453	3,434
Norwell	2,380	2,649
Norwood	7,123	6,761
Peabody	10,308	11,192
Pembroke	1,727	2,244
Quincy	16,719	16,055
Randolph	6,764	7,366
Reading	5,974	6,231
Revere	7,550	7,805
Rockland	4,074	4,019
Rockport	1,021	1,014
Salem	6,521	6,955
Saugus	6,135	6,286
Scituate	5,153	5,372
Sharon	3,731	3,638
*Sherborn	608	634
Somerville	13,311	12,914
Southboro	1,276	1,310
Stoneham	4,562	4,586
Stoughton	6,205	6,543
*Stow	813	964
*Sudbury	3,187	3,466
Swampscott	2,996	3,201
*Topsfield	982	871
Wakefield	5,436	5,452
Walpole	4,657	5,047
Waltham	11,479	11,190
Watertown	6,353	5,886
Wayland	4,092	3,743
Wellesley	6,101	5,864
*Wenham	618	561
Weston	2,912	2,886
Westwood	3,507	3,708
Weymouth	13,753	14,337
Wilmington	5,098	5,519
Winchester	5,448	5,448
Winthrop	3,641	3,760
Woburn	8,892	9,831
*Wrentham	809	831

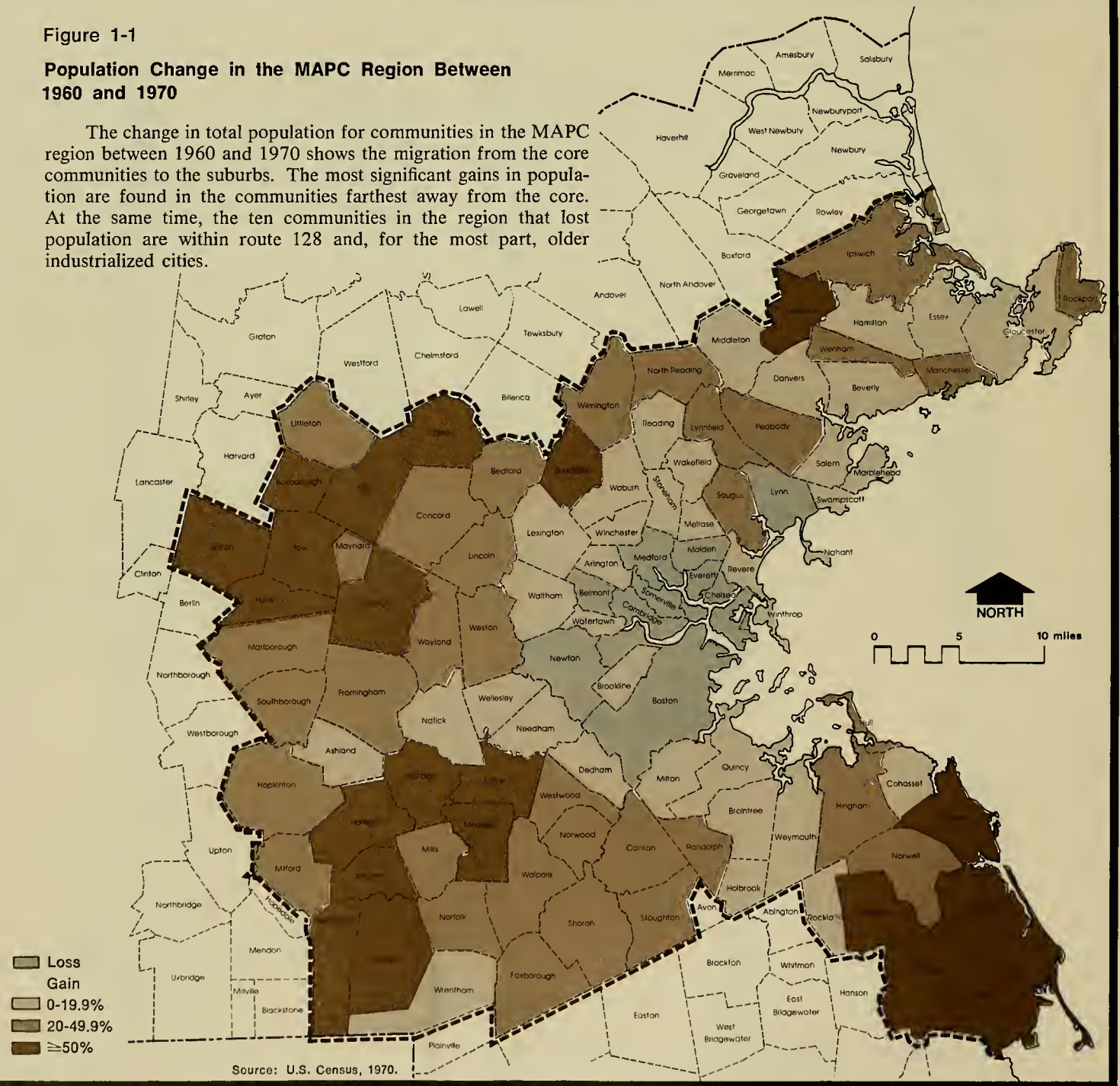
* School figures for these communities do not reflect regional school district participation.

Source: Massachusetts Selectmen's Association, 1976.

Figure 1-1

Population Change in the MAPC Region Between 1960 and 1970

The change in total population for communities in the MAPC region between 1960 and 1970 shows the migration from the core communities to the suburbs. The most significant gains in population are found in the communities farthest away from the core. At the same time, the ten communities in the region that lost population are within route 128 and, for the most part, older industrialized cities.

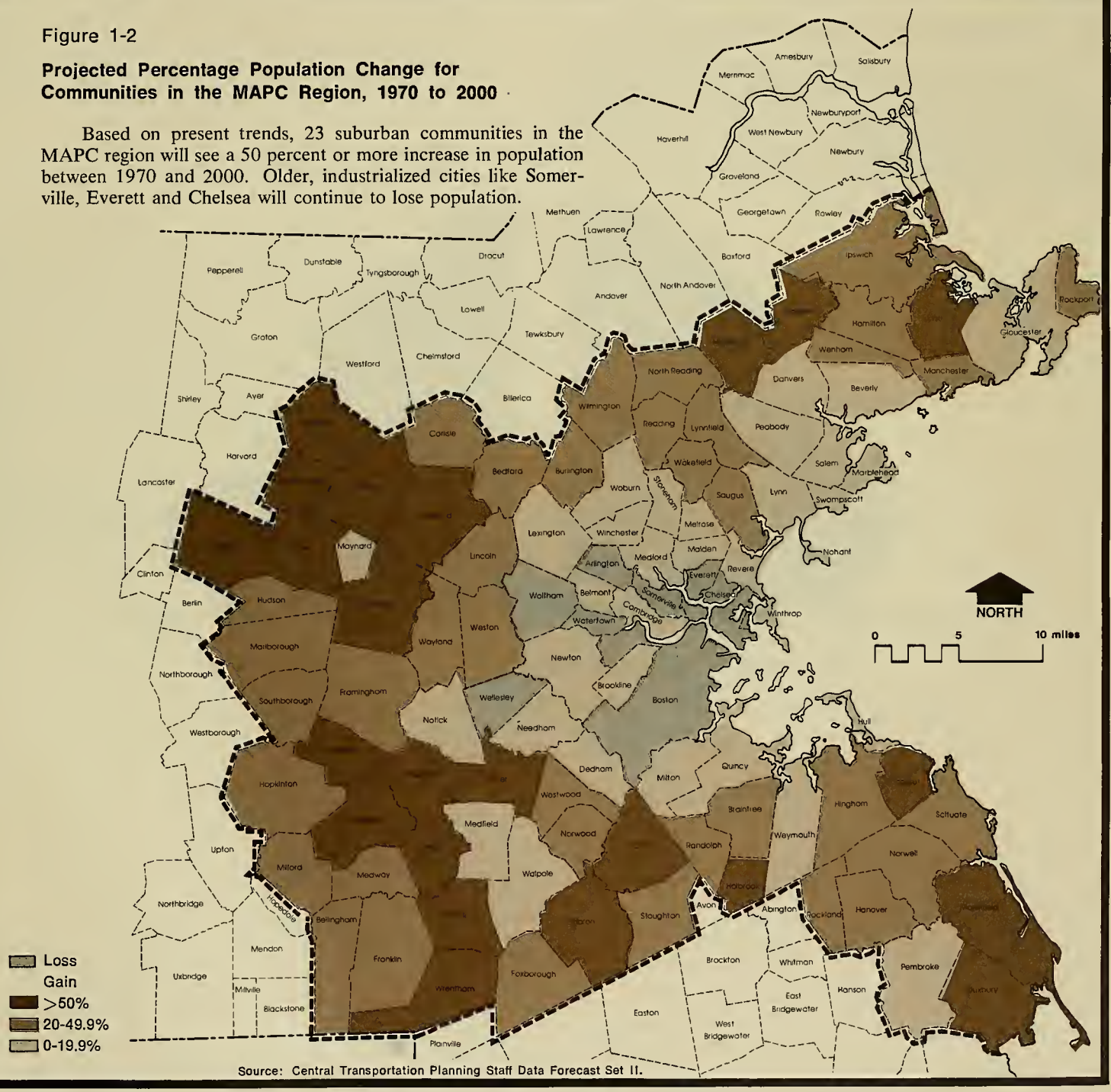


Source: U.S. Census, 1970.

Figure 1-2

Projected Percentage Population Change for Communities in the MAPC Region, 1970 to 2000

Based on present trends, 23 suburban communities in the MAPC region will see a 50 percent or more increase in population between 1970 and 2000. Older, industrialized cities like Somerville, Everett and Chelsea will continue to lose population.

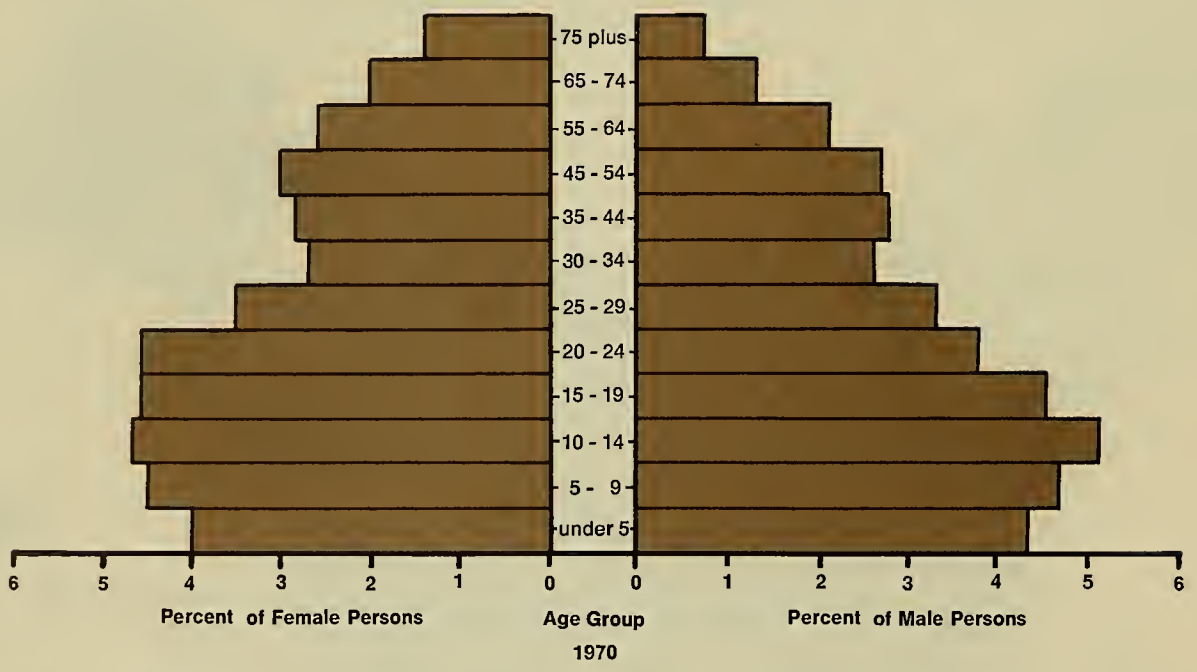


Source: Central Transportation Planning Staff Data Forecast Set II.

Figure 1-3

Age Characteristics of The Boston Metropolitan Area

The age and sex characteristics of the MAPC region's population in 1970 show that the children of the post war baby boom are now reaching child-bearing age. The result is a slowly expanding population that should begin to stabilize in the next few decades as a result of today's lower birthrates.



Source: U.S. Census, 1970.

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Planning for the Future.* Boston: Metropolitan Area Planning Council, 1977.
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Regional Report on Growth Policy and Addendum. Boston: Metropolitan Area Planning Council, 1976.
Towards a Growth Policy for Massachusetts: A Preliminary Draft. Boston: Massachusetts Office of State Planning, 1975.

* Contains useful maps.

MAPC Resources

MAPC Data Coordinator
44 School Street
Boston, MA 02108

MAPC Geographic Base File—DIME[1]
Address Coding Guide
44 School Street
Boston, MA 02108

[1] The Geographic Base File (GBF) is a computer representation of geogrephic and census features including streets, railroads, rivers, and town lines. Covering 44 MAPC communities, GBF printouts can be obtained for e fee by contecting MAPC.

Agency Contacts

Massachusetts Executive Office of Human Services
State House
Boston, MA 02133

Massachusetts Office of State Planning
John W. McCormack Building
One Ashburton Place
Boston, MA 02108

Metropolitan Area Planning Council
44 School Street
Boston, MA 02108

United Community Planning Corp.
14 Somerset Street
Boston, MA 02108

U.S. Department of Health, Education and Welfare
Human Development Office
JFK Federal Building
Boston, MA 02203

2
FOOD

**"Seeing is deceiving.
It's eating that's believing."**

—James Thurber

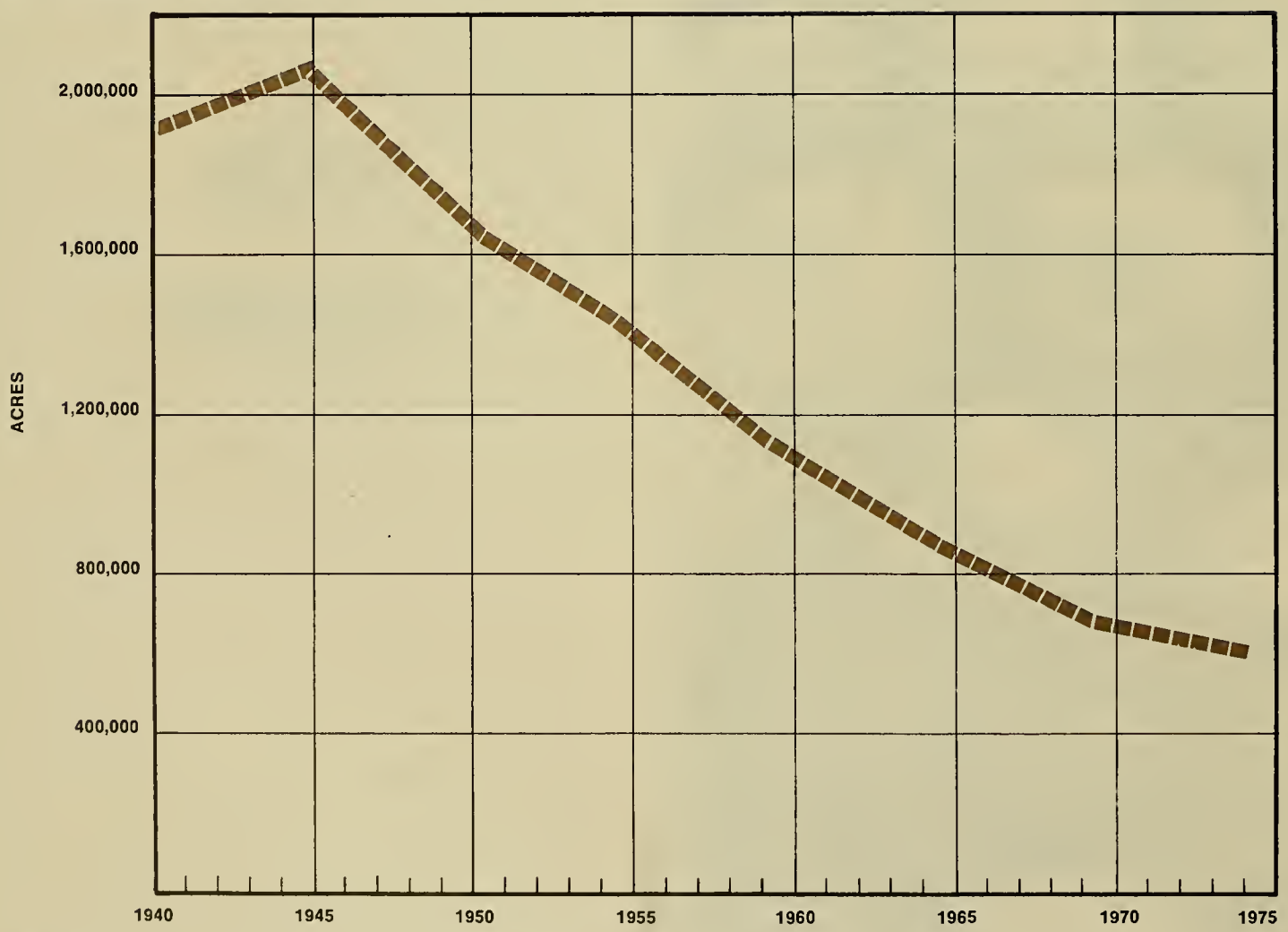
Figures 2-1 and 2-2

Change in Farm Acreage in the MAPC Region

Farm acreage in Massachusetts has declined dramatically since 1945. Similarly, farm acreage in most MAPC communities decreased by over 50 percent between 1951 and 1971. This is dramatic evidence of the region's declining farm activity.

Figure 2-1

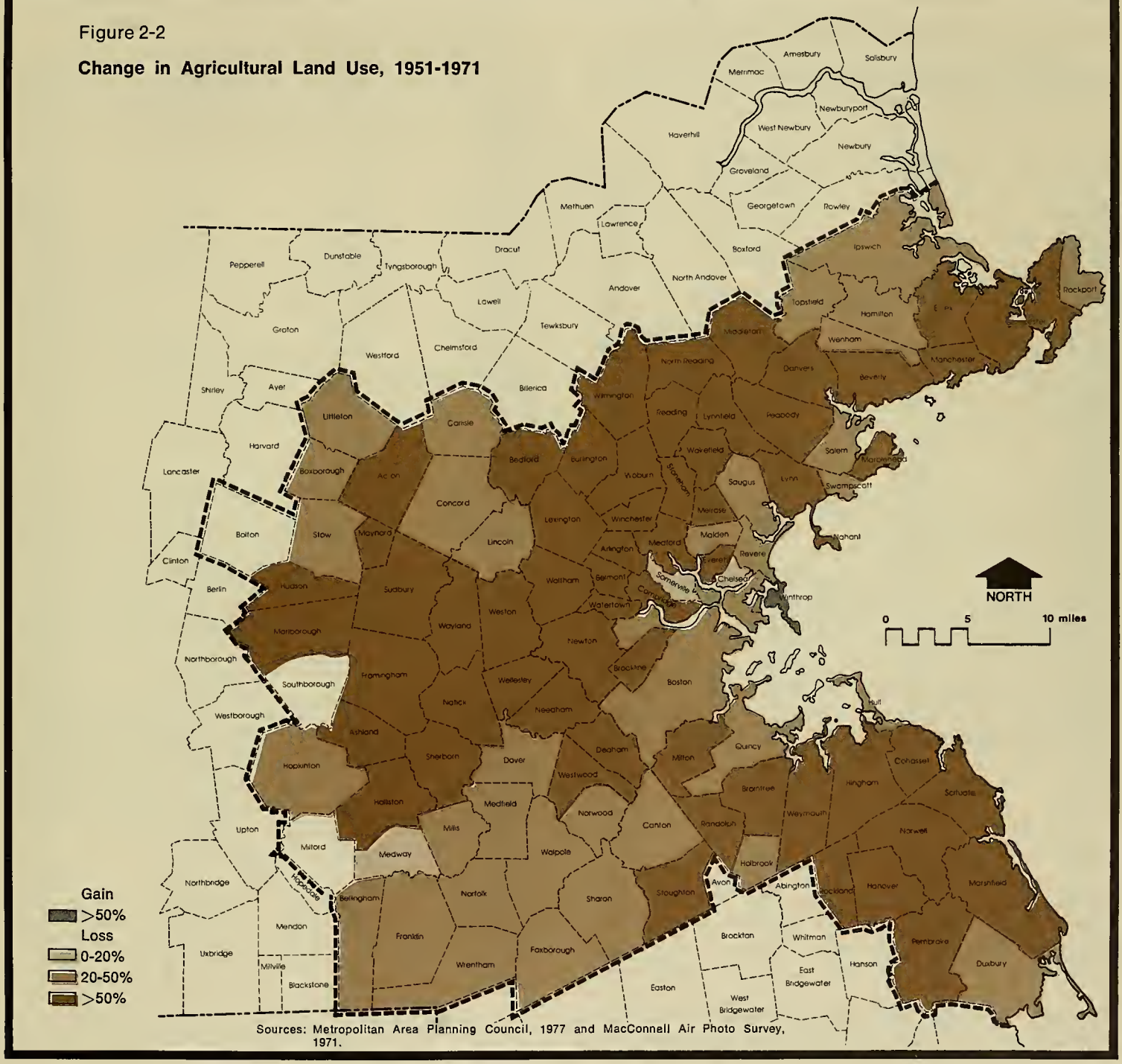
Farm Acreage in Massachusetts, 1940 to 1974



Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1971.

Figure 2-2

Change in Agricultural Land Use, 1951-1971



Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1971.

Table 2-1

Percentage of Agricultural Acreage by Municipality

Examination of the percentage of agricultural acreage by municipality reveals that outlying communities have more agricultural land than the built-up areas closer to the central city.

Municipality	% Agricultural Cropland	% Agricultural Pastureland	Total Acreage
Acton	4.80	1.78	12916
Arlington	0.22	—	3484
Ashland	3.64	1.52	8240
Bedford	3.95	1.19	8940
Bellingham	1.10	5.90	11949
Belmont	0.13	1.19	2920
Beverly	2.06	2.69	9926
Bolton	9.94	5.23	12773
Boston	0.20	0.25	31244
Boxborough	3.95	6.09	6680
Braintree	0.32	0.31	9100
Brookline	1.16	—	4359
Burlington	2.32	—	7528
Cambridge	0.23	—	4693
Canton	2.49	2.88	12460
Carlisle	5.08	2.91	9884
Chelsea	—	—	1604
Cohasset	0.38	0.34	6412
Concord	10.38	4.26	16536
Danvers	8.41	2.04	8738
Dedham	0.64	—	6958
Dover	3.85	1.92	9970
Duxbury	3.50	1.84	15454
Essex	1.87	5.03	9336
Everett	—	—	2344
Foxborough	2.55	0.74	13032
Framingham	4.01	1.97	16848
Franklin	4.35	4.43	17227
Gloucester	0.04	0.22	16973
Hamilton	3.25	8.72	9574
Hanover	2.37	1.06	9978
Hingham	2.84	0.39	14501
Holbrook	0.31	1.55	4769
Holliston	1.84	1.39	21176
Hudson	5.96	1.87	7680
Hull	0.86	0.23	1738
Ipswich	3.56	6.44	23204
Lexington	2.38	1.95	10972
Lincoln	7.61	2.52	9544
Littleton	10.85	6.50	11345
Lynn	—	—	7384
Lynnfield	1.04	0.48	6776
Malden	—	—	3252
Manchester	0.08	—	4984
Marblehead	0.65	—	2903
Marlborough	4.76	3.21	14390
Marshfield	1.18	2.10	18678
Maynard	0.76	0.85	3396
Medfield	4.95	1.61	9479
Medford	—	—	5648
Medway	7.16	6.47	7372
Melrose	—	—	3036
Middleton	3.73	3.98	9332
Milford	0.87	0.68	9808
Millis	5.81	8.30	7828
Milton	1.84	0.45	8495
Nahant	—	—	737
Natick	2.39	3.17	9992
Needham	2.06	0.04	8194
Newton	0.56	—	11252
Norfolk	6.09	2.10	10159
No. Reading	1.61	0.41	8680
Norwell	1.49	1.22	13133
Norwood	1.66	0.10	6610
Peabody	2.89	1.12	10768
Pembroke	3.33	1.05	15284
Quincy	—	—	10752
Randolph	0.50	0.50	6569
Reading	0.90	0.06	6388
Revere	0.37	—	4054
Rockland	0.34	0.56	6421
Rockport	0.51	2.26	4636
Salem	0.34	0.41	6016
Saugus	0.95	—	7320
Scituate	1.51	0.64	11281
Sharon	2.78	0.49	15432
Sherborn	1.99	9.25	10084
Somerville	—	—	2636
Southborough	6.22	4.45	9844
Stoneham	1.70	—	4332
Stoughton	1.89	1.95	10492
Stow	7.44	2.84	11672
Sudbury	8.82	2.30	15676
Swampscott	0.76	—	1956
Topsfield	6.11	4.84	8188
Wakefield	0.88	—	5112
Walpole	4.18	1.12	13330
Waltham	2.41	0.69	8812
Watertown	1.44	—	2708
Wayland	5.75	4.32	10168
Wellesley	0.48	0.44	6580
Wenham	4.56	6.67	5321
Weston	1.35	1.18	10948
Westwood	2.75	0.42	7118
Weymouth	0.15	0.69	11528
Wilmington	0.64	0.06	11076
Winchester	0.83	—	4060
Winthrop	—	—	1256
Woburn	3.66	0.66	8275
Wrentham	6.03	3.61	14447

Source: Study Element Number 3.05 of the Southeastern New England Study, 1973.

Note: Hopkinton Total acres 16,896 (not including water); agricultural acreage 1,377.54 (8%).

Table 2-2

Some Indices of Agricultural Activity in Massachusetts

While Massachusetts has 2.8 percent of the nation's population, and 2.5 percent of the nation's manufacturing shipments, its level of agricultural activity is only a fraction of 1 percent of the U.S. total. Massachusetts could never be expected to even approach self-sufficiency in agricultural production.

Index	Amount	% U.S. Amount in Massachusetts
Total Farm Acreage (1969)	700,578 acres	0.1%
Number of Farms (1969)	5,703	0.2%
Number of Eggs Produced (1974)	510,000,000	0.7%
Farm Income (1973)	$190,748,000	0.2%
Population (1970) (for comparison)	5,689,170	2.8%
Value of Manufacturing Shipments (1972) (for comparison)	$19,134,000,000	2.5%

Sources: U.S. Censuses of Population, 1970; Manufactures, 1972; Agriculture, 1969, 1974; Economic Research Service, U.S. Department of Agriculture, 1973, 1974.

Figures 2-3 through 2-5

Agricultural Acreage and Production

Since there is little agricultural data available at the MAPC level, the following three figures display data for the counties that include MAPC communities. In some counties, most of the agricultural acreage and production is probably in portions of the county that are not in the MAPC region.

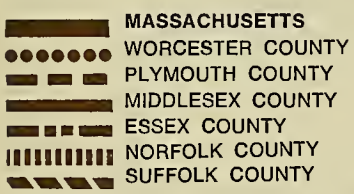
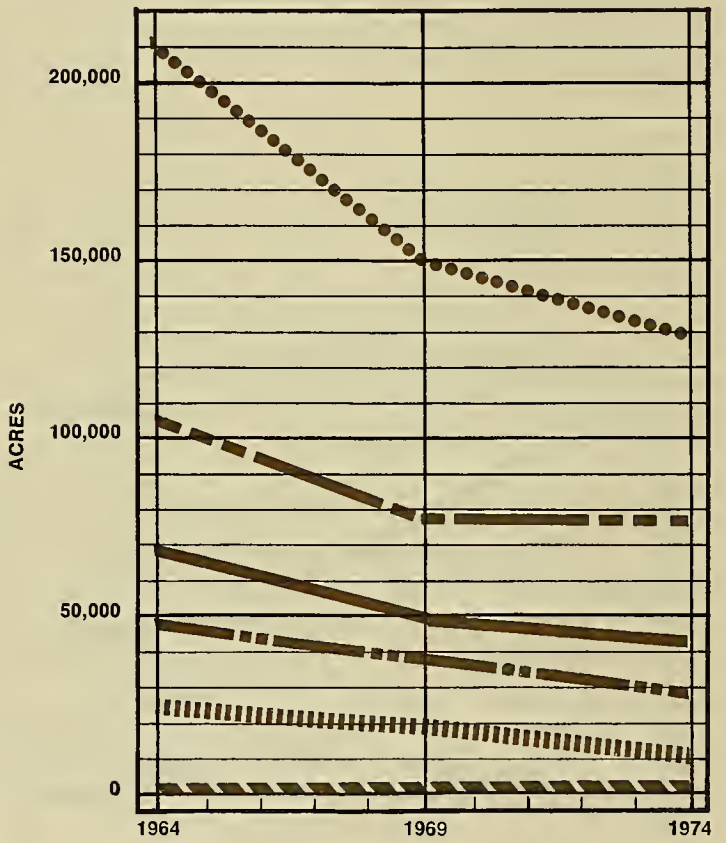


Figure 2-3

Farm Acreage by County in MAPC Region

From 1964 to 1974, farm acreage declined in all Boston area counties. In Worcester, Plymouth and Middlesex counties, however, the rate of decline has slackened since 1968.

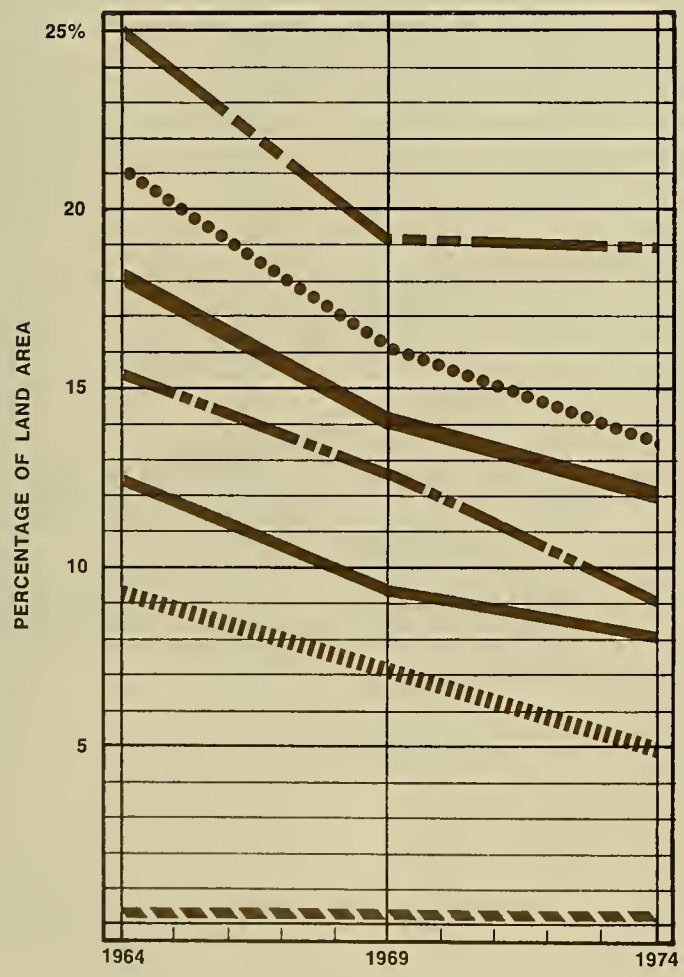


Source: U.S. Census of Agriculture 1969, 1974.

Figure 2-4

Percent of Land Acres in Farms for Massachusetts and Counties

The decline of county and state farm acreage as a percentage of total acreage decreased farming trends. Plymouth and Worcester counties have the highest percentages of land devoted to agriculture, while Suffolk and Norfolk have the least.

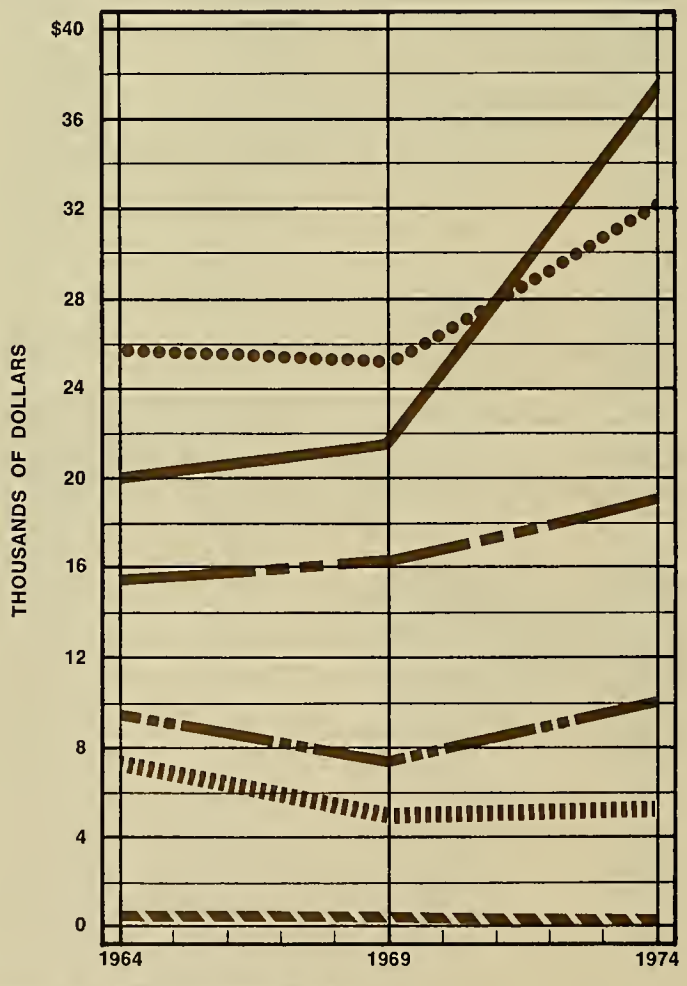


Source: U.S. Census of Agriculture 1969, 1974.

Figure 2-5

Market Value of Agricultural Products Sold in Counties in MAPC Region (in $1000)

Despite declining farm acreage, the value of farm products sold increased throughout the area's counties since 1969 and in some counties since 1964. The increase since 1969 in Middlesex County is particularly dramatic. Much, and in some cases all, of these increases in value of products sold can probably be attributed to inflation in food prices.

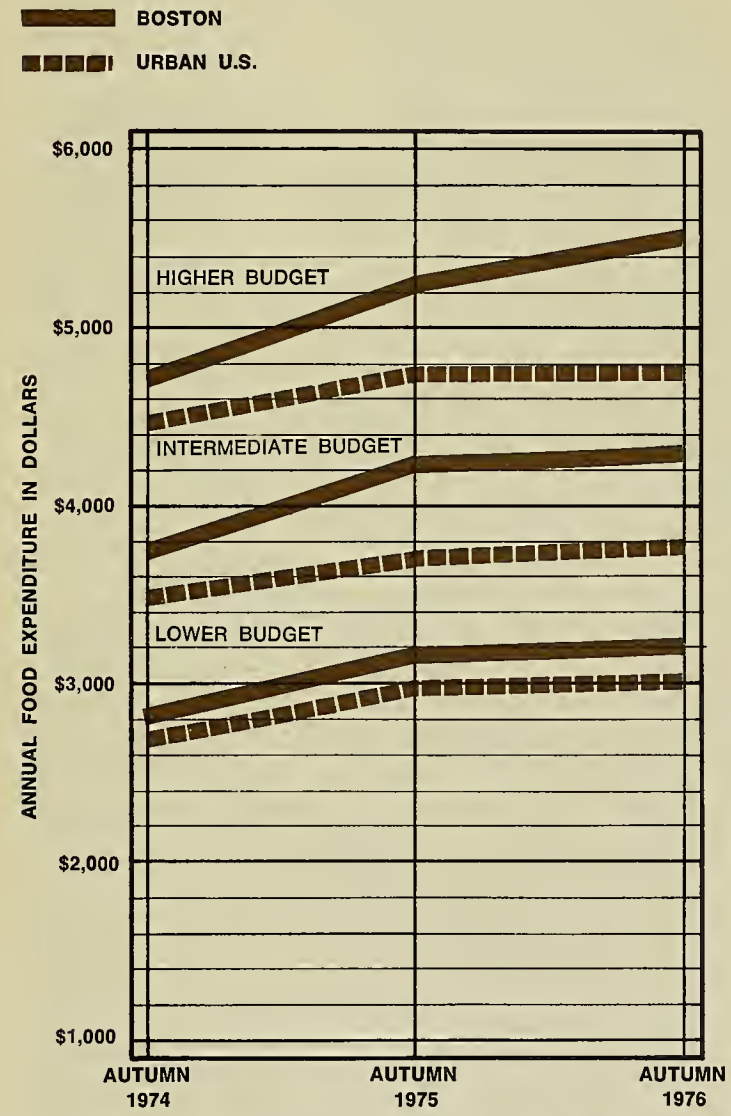


Source: U.S. Census of Agriculture 1969, 1974.

Figure 2-6

Typical Expenditures for Food in Three Hypothetical Four-Person Families in the Boston Metropolitan Area and Urban U.S.

Because food costs in the metropolitan Boston area are higher than those in the urban U.S. as a whole, Boston area families at each budget level spend more for food than the national average.

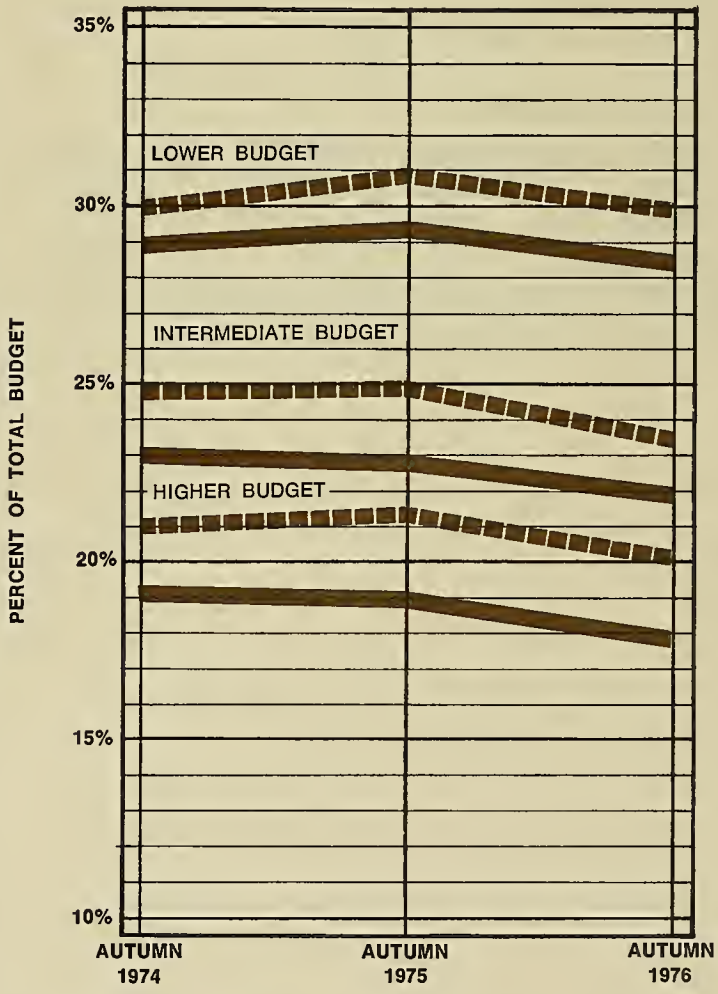


Source: U.S. Bureau of Labor Statistics, Consumer Price Index and Urban Family Budgets, 1974, 1975, 1976.

Figure 2-7

Percent of Total Budget Spent for Food by Three Hypothetical Families in the Boston Metropolitan Area and Urban U.S.

Because other costs like housing, taxes and automobile insurance are so high in the Boston area, families spend a lower percentage of their total budgets on food than in the urban United States as a whole. The percentage of family budgets spent for food declined slightly from 1975 to 1976. In addition, lower budget families must spend a higher percentage of their budgets for food than higher budget families.



Source: U.S. Bureau of Labor Statistics, Consumer Price Index and Urban Family Budgets, 1974, 1975, 1976.

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To Save the Farms: Benefits from Farmland. Interim Report of the Agricultural Land Preservation Committee. Boston: Massachusetts Department of Food and Agriculture, 1976.

MAPC Resources

Map (in-house reference only)
Open Agricultural Areas in MAPC region (scale: 1″ = 8000′)

Agency Contacts

Massachusetts Food and Agriculture Department
Saltonstall Building
100 Cambridge Street
Boston, MA 02202

U.S. Department of Agriculture
Statistical Reporting Service
130 Post Office Building
Boston, MA 02109

3
WATER

**"If there is magic on this planet,
it is contained in water."**

—Loren Eisley

Table 3-1

Water Supply Systems Log

MAPC communities are listed by major watershed and information is given on the agency or agencies distributing water, whether or not water is treated, source of water supply, system safe yield in millions of gallons per day, whether the system uses groundwater or surface water, the location or type of wastewater discharge and the amount of wastewater discharged in millions of gallons per day.

Charles/Mystic/Neponset Watershed: Charles River Sub-Basin

Municipality	Water Distribution Agency	Treatment	Source of Supply	Safe Yield in MGD	Supply Type	Proposed Sources	Discharge Location	Amount in MGD
Lincoln	Lincoln PWD	Yes	Wells in Lincoln	.7	gw	None	pss	
			Sandy Pond in Lincoln	.4	sw			
Waltham	Waltham DPW	Yes	MDC	10.8	sw	MDC	1) MDC to Boston Harbor 2) Charles River (overflow)	
Weston	Weston Water Dept.	Yes	MDC	2.5	sw	MDC	pss	
			Wells in Weston	2.2	gw			
Watertown	Watertown PWD	Yes	MDC	4.8	sw	MDC	1) MDC to Boston Harbor 2) Charles River (overflow)	
Cambridge	Cambridge Water Dept.	Yes	Hobbs Brook Res. (Camb. Res.) in Waltham		sw	MDC	1) MDC to Boston Harbor 2) Charles River (overflow)	
			Fresh Pond Res. in Cambridge	17.0 total				
			Stony Brook Res. in Western/ Waltham					
			MDC	8.9				
Brookline	Brookline PWD	Yes	MDC	7.4	sw	MDC	1) MDC to Boston Harbor 2) Muddy River to Charles (overflow)	
Newton	Newton Water Dept.	Yes	MDC	11.6	sw	MDC	MDC to Boston Harbor	
Wellesley	Wellesley PWD	Yes	Wells in Wellesley	7.7	gw	MDC	MDC to Boston Harbor	
Boston	Boston PWD	Yes	MDC	141.7	sw	MDC	MDC to Boston Harbor	

Source: Massachusetts Executive Office of Environmental Affairs, 1977.
Key: gw=groundwater, mgd=million gallons per day, pss=private sewage system, sw=surface water, sgd=sewered ground water discharge.

Charles/Mystic/Neponset Watershed: Charles River Sub-Basin (Continued)

Municipality	Water Distribution Agency	Treatment	Source of Supply	Safe Yield in MGD	Supply Type	Proposed Sources	Discharge Location	Amount in MGD
Needham	Needham PWD	Yes	Wells in Needham MDC	3.4 1.0	gw sw	MDC	MDC to Boston Harbor	
Dedham Westwood	Dedham Water Co.	Yes	Wells in Dedham Wells in Norwood Wells in Westwood	19.29	gw	gw MDC	MDC to Boston Harbor	
Natick	Natick PWD	Yes	Wells in Natick	9.2	gw	MDC	MDC to Boston Harbor	
Dover	Dover Water Co. Meadowbrook Water Trust Dover Water-works, Inc. Dover Water Dept. Dover Estates, Inc. McNamara Water Co.	No	Wells in Dover	1.0	gw	gw	pss	
Sherborn	Private wells				gw	gw	pss	
Holliston	Holliston Water Dept.	Yes	Wells in Holliston	1.9	gw	gw	pss	
Medfield	Medfield Water & Sewer Dept.	Yes	Wells in Medfield	1.29	gw	gw	to Charles River pss	.16
Millis	Millis Water Dept.	Yes	Wells in Millis	1.0	gw	gw	Sugar Br. to Charles River pss	.22
Medway	Medway Water Dept.	No	Wells in Medway	1.8	gw	gw Milford Water Co.	pss Great Black Swamp in Charles Basin	negli-gible
Milford	Milford Water Co.	Yes	Wells in Milford Charles River	.4 1.6	gw sw	Louisa Lake	Charles	2.76
Franklin	Franklin DPW	Yes	Wells in Franklin	2.4	gw	gw Milford Water Co.	Mine Brook to Chas. River	1.44
Norfolk	Norfolk Water Dept. Kingsbury Water Assoc.	Yes	Wrentham State School, Norfolk Correctional Institution	.39		gw	pss	
Wrentham	Wrentham Water Dept.	No	Wells in Wrentham	.98	gw	gw Milford Water Co.	pss	
Bellingham	Bellingham Water Dept.	No	Wells in Bellingham	2.2	gw	gw	pss	

Sources of supply for communities belonging to the Metropolitan District Commission include: Framingham Res. in Framingham, Sudbury Res. in Framingham, Walkers Brook in Marlboro, Chestnut Hill Res. in Newton, Weston Res. in Weston, Norumbega Res. in Weston, Wachusett Dam in Clinton/Boylston, Quinapoxet Pond in Princeton/Holden, Stillwater Basin in Sterling/Boylston, Gates Pond above Res. at Worcester, Quabbin Res. Windson Dam, Ware River in Barre, Spot Pond in Boston.

The Northfield Mountain Pumped Storage Reservoir is a proposed MDC source.

Charles/Mystic/Neponset Watershed: Mystic River Sub-Basin

Municipality	Water Distribution Agency	Treatment	Source of Supply	Safe Yield in MGD	Supply Type	Proposed Sources	Discharge Location	Amount in MGD
Woburn	Woburn PWD	Yes	Wells in Woburn	8.2	gw	MDC	Boston Harbor/MDC	
			Horn Pond in Woburn	5.0	sw			
Winchester	Winchester Water Dept.	Yes	MDC	1.4		MDC	MDC to Boston Harbor	
			Wells in Winchester	.7				
			North Res., Middle Res., South Res. in Winchester	.78				
Stoneham	Stoneham PWD	Yes	MDC	3.4	sw	MDC	MDC to Boston Harbor	
Melrose	Melrose PWD	Yes	MDC	3.0	sw	MDC	MDC to Boston Harbor	
Malden	Malden PWD	Yes	MDC	6.9	sw	MDC	MDC to Boston Harbor	
Medford	Medford Water and Sewer Dept.	Yes	MDC	8.1	sw	MDC	MDC to Boston Harbor	
Arlington	Arlington Water Dept.	Yes	MDC	6.8	sw	MDC	MDC to Boston Harbor	
Everett	Everett PWD	Yes	MDC	8.0	sw	MDC	MDC to Boston Harbor	
Chelsea	Chelsea PWD	Yes	MDC	3.6	sw	MDC	MDC to Boston Harbor	
Somerville	Somerville PWD	Yes	MDC	10.7	sw	MDC	MDC to Boston Harbor	
Belmont	Belmont Water Department	Yes	MDC	2.6	sw	MDC	MDC to Boston Harbor	
Saugus	Saugus PWD	Yes	MDC	2.9	sw	MDC	MDC to Boston Harbor	
Lynnfield	Lynnfield Center Water District	Yes	Wells in Lynnfield	1.4	gw	Increase storage capacity	Future: 1) Salem Harbor or 2) Boston Harbor	
	Lynnfield Water District		MDC	.3	sw			
Reading	Reading DPW	Yes	Wells in North Reading	5.9	gw	Lynnfield Reservoir	Boston Harbor	
Revere	Revere PWD	Yes	MDC	3.9	sw	MDC	MDC to Boston Harbor	
Nahant	Nahant PWD	No	MDC	.6		MDC	MDC to Boston Harbor	
Wakefield	Wakefield PWD	Yes	Well in Wakefield		gw	MDC		
			Crystal Lake in Wakefield	3.0	sw			
			MDC	2.2				
Winthrop	Winthrop Water Dept.	No	MDC	1.8	sw	MDC	MDC to Boston Harbor	

Charles/Mystic/Neponset Watershed: Neponset River Sub-Basin

Municipality	Water Distribution Agency	Treatment	Source of Supply	Safe Yield in MGD	Supply Type	Proposed Sources	Discharge Location	Amount in MGD
Sharon	Sharon DPW	Yes	Wells in Sharon	3.7	gw	gw	MDC to Boston Harbor	
Stoughton	Stoughton PWD	No	Wells in Stoughton	1.7	gw	MDC	MDC to Boston Harbor	
			Well in Sharon	.90				
Canton	Canton DPW	Yes	Wells in Canton	3.0	gw	gw	MDC to Boston Harbor	
			MDC	1.0	sw	MDC		
Norwood	Norwood PWD	Yes	Wells in Norwood	4.5	gw	treated gw	MDC to Boston Harbor	
			MDC	3.0	sw			
Walpole	Walpole Water & Sewer Dept.	Yes	Well in Walpole	2.2	gw	gw Willett Pond in Walpole	MDC to Boston Harbor	
Westwood (see Dedham)	Dedham Water Co.	Yes	Dedham wells		gw sw	gw MDC thru Derham	MDC to Boston Harbor	
Milton	Milton Water Dept.	Yes	MDC	2.5	sw	MDC	MDC to Boston Harbor	
Quincy	Quincy DPW	Yes	MDC	10.2	sw	MDC	MDC to Boston Harbor	

Merrimack River Watershed

Lexington	Lexington PWD	Yes	MDC		sw		MDC to Boston Harbor	
Burlington	Burlington Water & Sewer District	Yes	Shawsheen River	3.0	sw		MDC to Boston Harbor	
			Wells in Lexington	4.66	gw			
Littleton	Littleton Water Dept.	No	Wells in Littleton	1.60	gw		pss	

Merrimack River Watershed: Concord River Sub-Basin

Carlisle	Private wells				gw		pss	
Bedford	Bedford Water Dept.	Yes	Wells in Concord	.40	gw		MDC to Boston Harbor	
			Wells in Bedford	1.36				
Concord	Concord Water Dept.	Yes	Nagog Pond in Acton	2.0	sw		Concord River	
	Kalmia Woods Water Dept.		Wells in Concord	3.0	gw			

Merrimack River Watershed: Sudbury River Sub-Basin

Municipality	Water Distribution Agency	Treatment	Source of Supply	Safe Yield in MGD	Supply Type	Proposed Sources	Discharge Location	Amount in MGD
Sudbury	Sudbury Water District	Yes	Wells in Sudbury	3.10	gw	gw	pss	
Wayland	Wayland Water Dept.	No	Wells in Wayland	5.6	gw	gw	pss	
Framingham	Framingham DPW	Yes	MDC in Framingham		sw	MDC	MDC to Boston Harbor	
			Wells in Framingham	2.26	gw			
Southborough	Southborough Water Dept.	Yes	MDC in Marlborough	.39	sw	MDC	pss	
Ashland	Ashland Water Dept.	No	Wells in Ashland at the Hopkinton Res.	2.0	gw		Boston Harbor	
Hopkinton	Hopkinton Water Dept.	No	Wells in Hopkinton	.60	gw		pss	
Marlborough	Marlborough DPW	Yes	MDC in Marlborough		sw	MDC	1) Hop Brook in Sudbury	2.5-3.0
			Millham Brook Res. in Marlborough	1.50			2) Assabet River	2.5
			Lake Williams Res. in Marlborough	.50				

Merrimack River Watershed: Assabet River Sub-Basin

Hudson	Hudson PWD	Yes	Gates Pond in Hudson	.70	sw	gw	Assabet River	
			Fosgate Brook in Hudson		gw	sw		
			Crystal Spring in Hudson	.07				
			Wells in Hudson	1.50				
Stow	Juniper Hill Realty Trust Water Co.	Yes	Wells in Stow	.79	gw		pss	
	Assabet Water Co.							
Bolton	Private wells				gw		pss	
Maynard	Maynard Public Works Dept.	Yes	White Pond Res. in Stow	.60	sw		Assabet River	
			Well in Maynard	.40	gw			
Acton	Water Supply Dist. of Acton	Yes	Wells in Acton	3.22	gw		pss	
Boxborough	Private wells				gw		pss	

North Shore Watershed

Municipality	Water Distribution Agency	Treatment	Source of Supply	Safe Yield in MGD	Supply Type	Proposed Sources	Discharge Location	Amount in MGD
Peabody	Peabody DPW	Yes	Spring Pond in Salem/Lynn/ Peabody	2.8	sw gw	Reservoir 30-B	South Essex Sewerage District to Salem/ Beverly Harbor (SESD)	25.0
			Suntaug Pond in Peabody	1.4				
			Winona Pond	3.0				
			MDC	1.0				
			Wells in Peabody	2.0				
Lynn	Lynn DPW	Yes	Hawkes Pond in Lynn		sw	Increase storage capacity	Lynn Harbor	15.0
			Walden Pond in Lynn	17.0				
			Birch Pond in Lynn					
			Breeds Pond in Lynn					
			Diversion from Ipswich River in Reading					
			Saugus River in Reading					
Swampscott	Swampscott PWD	Yes	MDC	1.6	sw	MDC	Nahant Bay	1.5
Marblehead	Marblehead Water Dept.	Yes	MDC	2.2	sw	MDC	SESD	(see Peabody)
Beverly/Salem	Beverly PWD Salem DPW	Yes Yes	Wenham Lake and Longham Res. in Wenham	3.1	sw	Topsfield Res. Reservoir 30-B	SESD	(see Peabody)
			Ipswich River Diversion in Salem	8.3				
Nahant	Nahant PWD	Yes	MDC		sw	MDC		
Lynnfield	Lynnfield Ctr. Water District Lynnfield Water District	No	MDC		sw	MDC		
Wakefield	Wakefield PWD	No	MDC		sw	MDC		
Saugus	Saugus PWD	No	MDC		sw	MDC		
Revere	Revere PWD	No	MDC		sw	MDC		

North Shore Watershed: Cape Ann Sub-Basin

Municipality	Water Distribution Agency	Treatment	Source of Supply	Safe Yield in MGD	Supply Type	Proposed Sources	Discharge Location	Amount in MGD
Essex	Essex Water Dept.	Yes	Wells in Essex	1.1	gw	gw	pss	
			Chebacco Lake in Essex/Hamilton	.40	sw			
Manchester	Manchester Water & Sewer Dept.	Yes	Gravelly Pond in Hamilton/ Manchester	1.4	sw	None	Manchester Harbor	.67
			Wells in Manchester	.9	gw			
Gloucester	Gloucester DPW	Yes	Babson Res. in Gloucester	.95	sw	Reservoir 30-B	Gloucester Harbor	5.0-7.0
			Haskell Res. in Gloucester	.62				
			Wallace Res. in Gloucester	.20				
			Dikes Res. in Gloucester	.54				
			Goose Cave Res. in Gloucester	.63				
			Wells in Gloucester	.59				
Rockport	Rockport DPW	Yes	Cape Pond in Rockport	.3				
			Carlson's Quarry in Rockport	.2				
			Wells in Rockport	.3				

North Shore Watershed: Ipswich River Sub-Basin

Boxford	Private wells				gw	Private wells	Future: 1) Ipswich R. 2) Salem Harbor Present: pss
Topsfield	Topsfield Water Dept. Wylde Wood Water Works	Yes	Wells in Topsfield	.8	gw	Reservoir 30-B	Future: 1) Ipswich R. 2) Salem Harbor Present: pss
Hamilton	Hamilton Water Dept.	Yes	Wells in Hamilton	1.85	gw	Reservoir 30-B	Future: 1) Ipswich R. 2) Salem Harbor Present: pss
Wenham	Wenham Water Dept.	Yes	Wells in Wenham	1.4	gw	None required	Future: 1) Ipswich R. 2) Salem Harbor Present: pss
North Reading	N. Reading DPW	Yes	Wells in North Reading	1.3	gw	Lynnfield Res. 30-B	Future: 1) Salem Harbor 2) Boston Harbor Present: pss

Municipality	Water Distribution Agency	Treatment	Source of Supply	Safe Yield in MGD	Supply Type	Proposed Sources	Discharge Location	Amount in MGD
Wilmington	Wilmington Water & Sewer Dept.	No	Wells in Wilmington	7.1	gw	Lynnfield Res. 30-B	Boston Harbor MDC	
Ipswich	Ipswich Water Dept.	Yes	Dow Brook Res. in Ipswich	.4	sw gw	Reservoir 30-B	Ipswich River (Greenwood Creek)	.8-1.0
			Wells in Ipswich	1.4				
Danvers/ Middleton	Middleton Water Comm.	Yes	Middleton Pond in Middleton		sw	Lynnfield Res.	pss	
	Danvers Water Dept.	Yes	Swan Pond in North Reading	6.0	sw & gw			
			Emerson Brook in Middleton					
			Wells in Danvers	1.75				
South Shore Watershed								
Duxbury	Duxbury Fire & Water Dept.	No	Wells in Duxbury	2.82		gw	pss	
Pembroke	Pembroke Water Dept.	Yes	Wells in Pembroke	1.78	gw sw	gw	pss	
			Abington & Rockland Water Works	.01				
			Duxbury Water Dept.	.01				
Holbrook	Holbrook Water Dept.	Yes	(see Randolph)		sw gw	(see Randolph)	MDC to Boston Harbor	
Hull	Nantasket Beach Water Co.	No	(see Hingham)		gw	(see Hingham)	MDC to Boston Harbor	
Hanover	Hanover PWD	Yes	Wells in Hanover	3.37	gw	Treated gw	pss	
Norwell	Norwell Water Dept.	No	Wells in Norwell	1.90	gw	gw	pss	
Marshfield	Marshfield Water Dept.	No	Wells in Marshfield	5.8	gw	gw	Brant Rock	.05
Rockland	Rockland Water Dept.	Yes	Great Sandy Bottom Pond in Pembroke	1.00	sw gw	gw Hingham St. Res. in Rockland	North River	.85
Joint supply with Abington See: Taunton River Watershed			Wells in Pembroke	1.10				
			Well in Abington	.72				
			Well in Rockland	.58				

South Shore Watershed (Continued)

Municipality	Water Distribution Agency	Treatment	Source of Supply	Safe Yield in MGD	Supply Type	Proposed Sources	Discharge Location	Amount in MGD
Scituate	Scituate DPW	Yes	Old Oaken Bucket Pond - First Herring Brook Res. in Scituate	2.00	sw	Upper First Herring Brook Res. in Scituate gw treated	sgd	
			Wells in Scituate	2.27	gw			
			Marshfield Water Dept.	.10				
Cohasset	Cohasset Water Dept.	Yes	Lily Pond Well in Cohasset	.66	gw	Bound Brook Res. in Cohasset and water treatment plant—3mgd capacity	James Brook/ Cohasset Harbor	.05
			Hingham Water Company	.09				
Hingham	Hingham Water Company	Yes	Fulling Mill Well in Hingham	2.2	gw	None	MDC to Boston Harbor	
			Wells in Hingham	4.80				
Weymouth	Weymouth DPW	Yes	Great Pond in Weymouth	9.0	gw sw	Treated gw	MDC to Boston Harbor	
Braintree	Braintree Water Dept.	Yes	Great Pond Res. in Braintree	4.0	sw gw	Further development of Richardi Res. in Braintree	MDC to Boston Harbor	
Randolph	Randolph Water Dept.	Yes	Great Pond Res. in Randolph/ Braintree	4.8	sw	Further development of Richardi Res. in Braintree	MDC to Boston Harbor	
			Wells in Randolph	2.8				

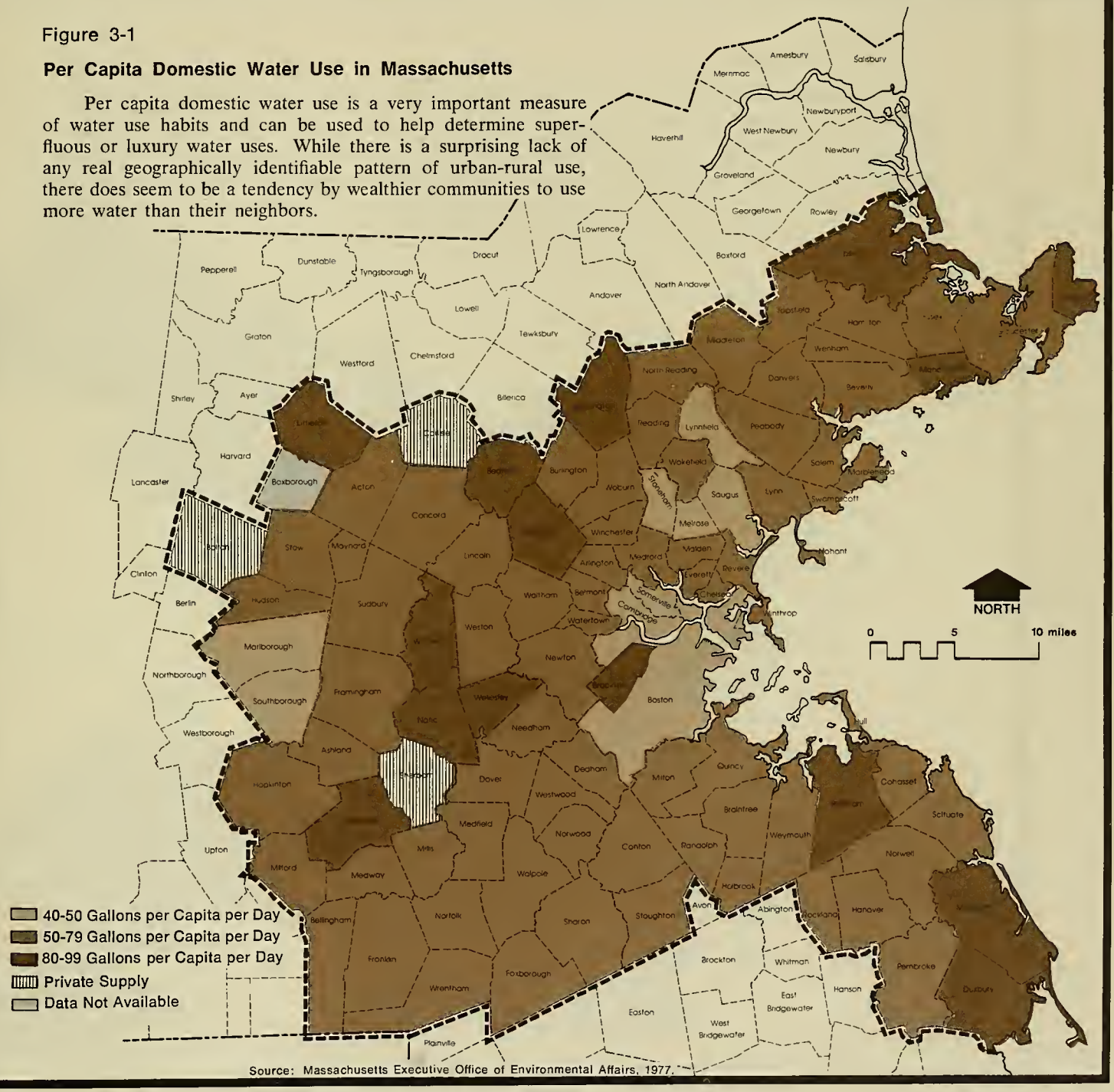
Taunton River Watershed

Foxboro	Foxboro Water Dept.	Yes	Wells in Foxboro	3.88	gw	gw Taunton Regional System	Present: Robinson Brook Future: Three Mile River	

Figure 3-1

Per Capita Domestic Water Use in Massachusetts

Per capita domestic water use is a very important measure of water use habits and can be used to help determine superfluous or luxury water uses. While there is a surprising lack of any real geographically identifiable pattern of urban-rural use, there does seem to be a tendency by wealthier communities to use more water than their neighbors.

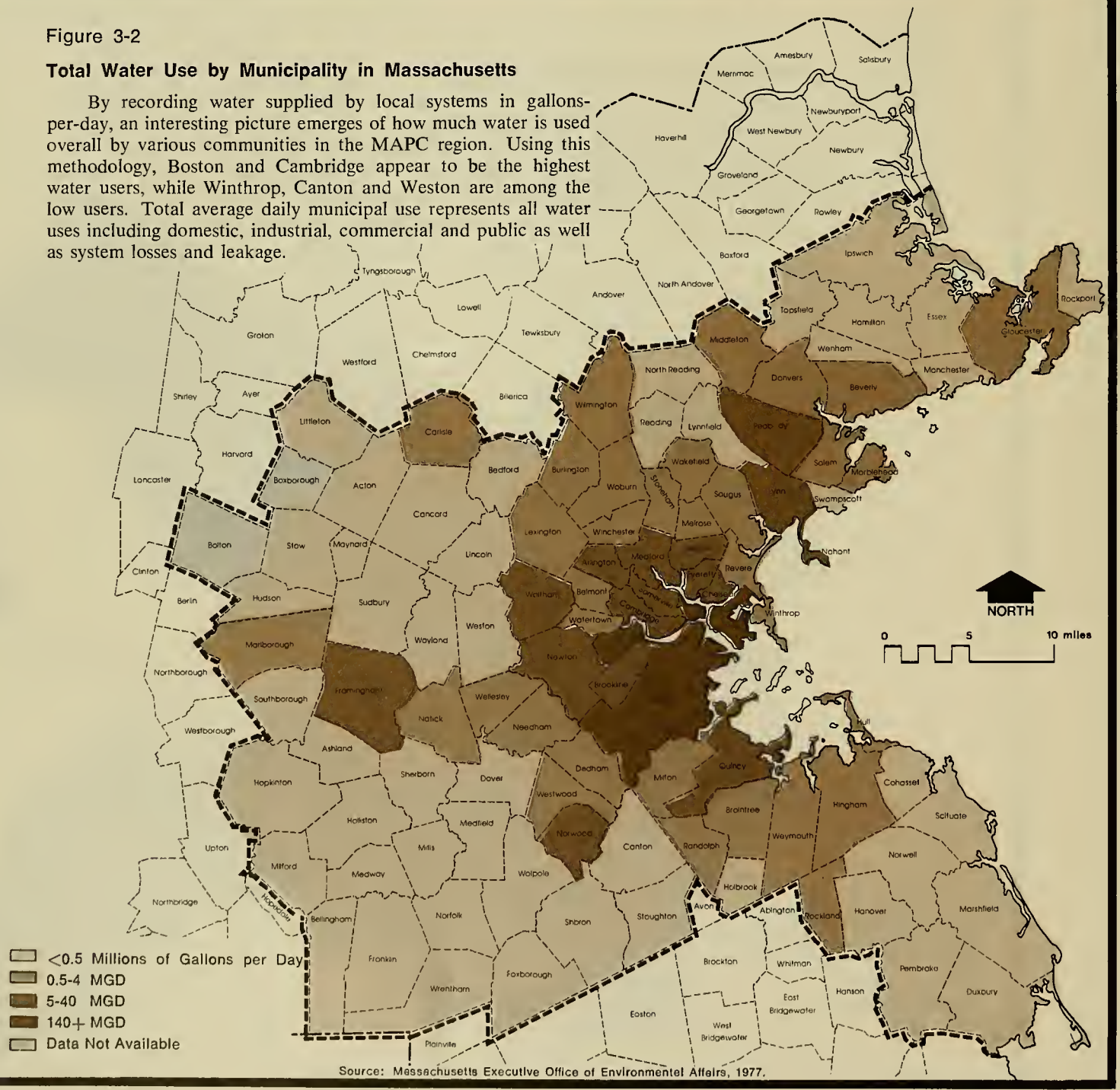


Source: Massachusetts Executive Office of Environmental Affairs, 1977.

Figure 3-2

Total Water Use by Municipality in Massachusetts

By recording water supplied by local systems in gallons-per-day, an interesting picture emerges of how much water is used overall by various communities in the MAPC region. Using this methodology, Boston and Cambridge appear to be the highest water users, while Winthrop, Canton and Weston are among the low users. Total average daily municipal use represents all water uses including domestic, industrial, commercial and public as well as system losses and leakage.

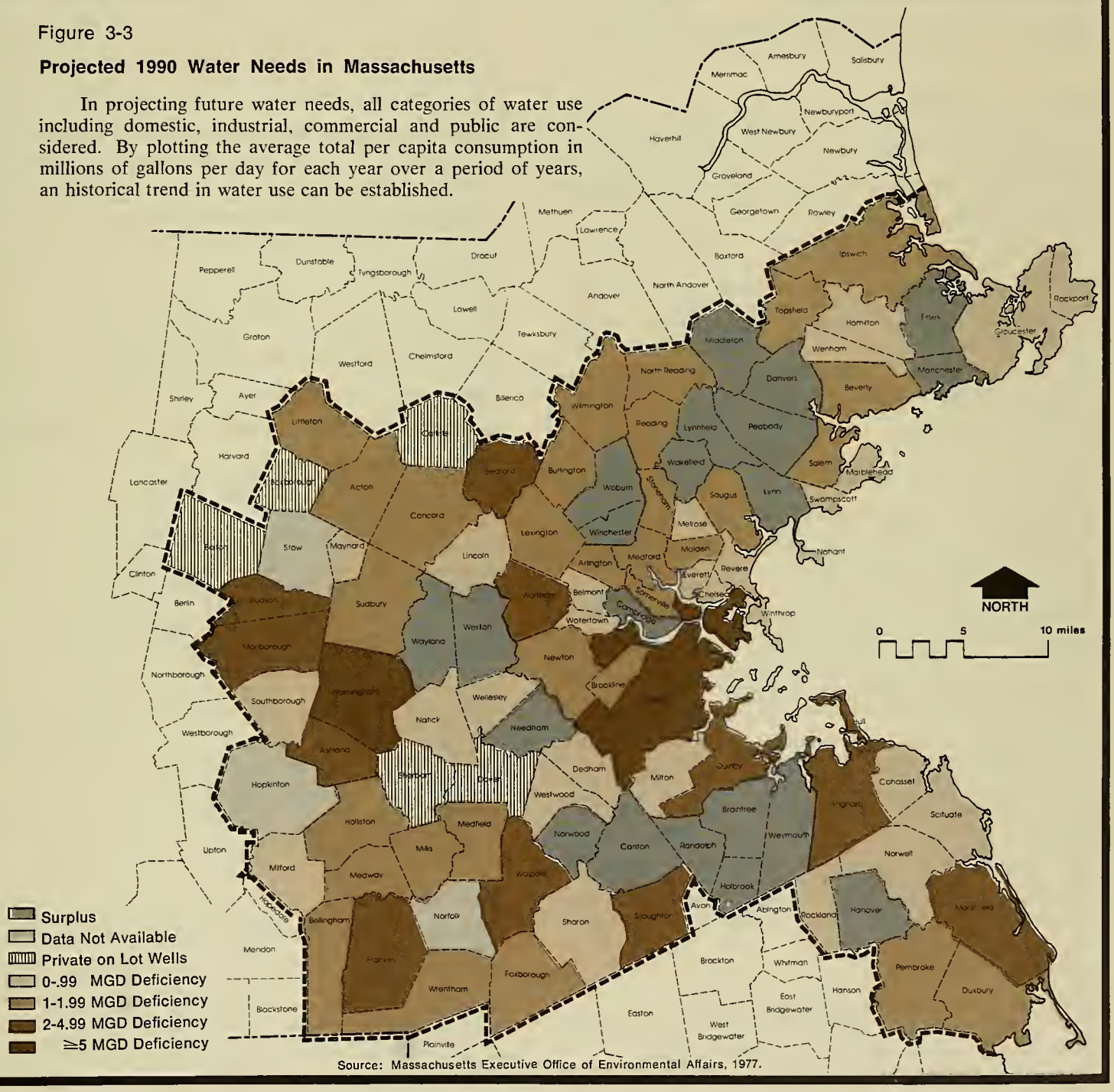


Source: Massachusetts Executive Office of Environmental Affairs, 1977.

Figure 3-3

Projected 1990 Water Needs in Massachusetts

In projecting future water needs, all categories of water use including domestic, industrial, commercial and public are considered. By plotting the average total per capita consumption in millions of gallons per day for each year over a period of years, an historical trend in water use can be established.



Source: Massachusetts Executive Office of Environmental Affairs, 1977.

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Maps (in-house reference only)
Ipswich River Watershed (scale: 1″ = 3000′)
Lower Charles River Watershed (scale: 1″ = 3000′)
Mystic River Watershed (scale: 1″ = 3000′)
Neponset River Watershed (scale: 1″ = 3000′)
North Coastal Streams Watershed (scale: 1″ = 3000′)
North/South Rivers Watershed (scale: 1″ = 3000′)
SuAsCo River Watershed (scale: 1″ = 3000′)
Upper Charles River Watershed (scale: 1″ = 3000′)
Weymouth River Watershed (scale: 1″ = 3000′)
Severe Soil Limitations for Septic Systems (scale: 1″ = 3000′)
Groundwater Favorability (scale: 1″ = 3000′)
Water Service Areas (scale: 1″ = 8000′)
Sewer Service Areas (scale: 1″ = 8000′)
Water Quality and Treatment Facilities (scale: 1″ = 8000′)
Regional Outline Base with Water Systems and Town Names (scale: 1″ = 8000′)
Maps (available upon request)
Watersheds in MAPC Region (size: 8½″ x 11″)
Water Districts in MAPC Region (size: 8½″ x 11″)
Sewerage Districts (size: 8½″ x 11″)
Watersheds (size: 17″ x 17″)
Sewerage Districts (size: 17″ x 17″)

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New England Interstate Water Pollution Control Commission
607 Boylston Street
Boston, MA 02116

New England River Basin Commission
55 Court Street
Boston, MA 02108

Soil Conservation Service
University of Massachusetts
Amherst, MA 01003

U.S. Geological Survey
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Boston, MA 02114

4

AIR AND NOISE

**"Air has no residence, no neighbor,
no ear, no door
no apprehensions of another
oh! Happy Air**

—Emily Dickinson

"Noise is manufactured in the city, just as goods are manufactured. The city is a place where noise is kept in stock, completely detached from the object from which it came."

—Max Picard

Air Quality

The United States Environmental Protection Agency, as authorized by the Clean Air Act as amended in 1977, is responsible for the establishment of air quality standards as well as the programs and regulations which will satisfy these standards. The EPA requires state governments to establish Air Quality Control Regions within the state and to develop state implementation plans for each. The MAPC region substantially conforms to one of the Air Quality Regions within Massachusetts. The Commonwealth, under the auspices of the Department of Environmental Quality Engineering, has developed an implementation plan for the Air Quality Control Region which includes the MAPC.

The EPA has identified six major pollutants which threaten the quality of air and has established primary and secondary ambient air quality standards for those pollutants. Primary standards have been set to protect "public health" and secondary standards have been set to protect "public welfare." The following is a brief description of each of these six major pollutants, the federal air quality standards associated with each pollutant, and the number of air quality monitoring stations which measure and violate these standards in the Boston metropolitan area.

1. *Carbon Monoxide (CO):* A colorless, odorless, poisonous gas produced by incomplete combustion of carbon fuels. More than three quarters of all CO emissions came from internal combustion engines, chiefly those in automobiles. Carbon monoxide accounts for almost 50 percent of the nation's air pollution. Carbon monoxide is absorbed into the human body through the lungs and reduces the ability of blood to supply oxygen to the body.

Primary Standard	Number of stations in violation
40 mg/over one hour period	0/6

Secondary Standard	Number of stations in violation
10 mg/m^3 over 8 hour period	5/6

2. *Total Suspended Particulates (TCP):* Particles of solid or liquid substances produced primarily by stationary fuel combustion furnaces and industrial processes. TCP exist in a very wide range of sizes, from those visible as soot and smoke to particles too small to detect without the aid of a microscope. Particulates contribute to lower respiratory infections by "carrying" other pollutants, particularly sulphur dioxide, deep into the respiratory system.

Primary Standard	Number of stations in violation
a. 260 mg/m^3 over a 24 hour period	a. 0/20
b. An annual geometric mean of 75 mg/m^3	b. 2/20

Secondary Standard	Number of stations in violation
An annual maximum of 150 mg/m^3	2/20

3. *Sulfur Dioxide (SO_2):* SO_2, by itself, is relatively innocuous, but because it intereacts with water to form sulfuric acid (H_2SO_4) and other compounds, national air quality standards have been established for it. SO_2 is produced chiefly when fuel containing sulfur is burned. Oil and coal electric generation plants and industrial plants are prime emitters of SO_2.

Primary Standard	Number of stations in violation
a. 365 mg/m^3 over 24 hour period	0/21
b. Annual average of 80 mg/m^3	0/21

4. *Nitrogen Dioxide (No_2):* Nitrogen Dioxide is produced as a result of the interaction of Nitrogen Oxide and sunlight. Nitrogen Oxide is emitted when fuel is burned at very high temperatures. Stationary combustion furnaces produce roughly half of the nitrogen oxide emissions while transportation vehicles produce the other half. At high concentrations, No_2 contributes to respiratory tract infections.

Primary Standard	Number of stations in violation
Annual mean of 100 mg/m^3	0/21

5 and 6. *Photo chemical oxidants and hydrocarbons:* Photo chemical oxidants are produced by a complex interaction of hydrocarbons, nitrogen oxide, and sunlight. Hydrocarbons are added to the air through the burning of fossil fuels and the evaporation of volatile liquids. Photo chemical oxidants cause eye, throat, and nose irritations at low concentrations and asthmatic attacks and pulmonary dysfunctioning at higher concentrations. Since ozone(O_3) is the predominant chemical constituent in the family of compounds called photo chemical oxidants, ozone is used to establish the standard for photo chemical oxidants as well as hydrocarbons.

Primary Standard	Number of stations in violation
160mg/m^3 over a 1 hour period	8/8

The 1977 amendments to the Clean Air Act require conformance to air quality standards by December 31, 1982 unless a state can show that these standards cannot be met despite the implementation of all reasonable available measures. In any instance, national air quality standards must be attained no later than December 31, 1987. Therefore, a review of the state implementation plan for the Air Quality Control Region encompassing the MAPC district will be required in order that compliance be achieved for currently unattained standards.

Noise

The most important source of environmental noise disturbance is transportation activity, particularly involving airplanes and trucks. The noise impacts associated with airports tend to be severe but concentrated; those associated with heavy auto and truck routes tend to be less severe but more widespread. Within the MAPC region, the predominant sources of community noise annoyance include:

1. Logan International Airport—the single major generator of noise disturbance in the region, primarily due to round-the-clock jet takeoff and landing activity and proximity to the East Boston and Winthrop residential areas.

2. Other regional airports—Bedford (Hanscom), Beverly, Marshfield, Norwood, and South Weymouth Naval Air Station. Of these five airports, Bedford, Beverly and Norwood experience only limited jet operations (small business corporate jets); South Weymouth experiences considerable military jet activity.

3. The regional highway network—especially the Interstate highways (I-90, I-93, I-95 and the Central Artery). Noise-sensitive land uses for residences and schools located within 500 feet of such limited-access high-speed expressways are subject to likely traffic-noise impact, depending on terrain and geometric configuration of the roadway. In the absence of other major sources, the expressway will determine the background noise level, or lower threshold of the noise climate, out to about 2000 feet.

4. Traffic on local streets—especially streets which act as though routes for heavy trucks such as Prospect Street in Cambridge or Lowney Way in Charlestown. The noise problems generated by such situations tend to be confined to single streets or a single row of housing.

5. Railroads and rapid transit—The communities along the railroad routes and surface and elevated sections of the rapid transit and trackless trolley are exposed to noise. The primary source of noise and vibration is the wheel/rail interaction. Secondary noise radiation resulting from the vibration of elevated structures often exceeds the primary radiation from the wheels and rails.

Generally speaking, the following ranges of average maximum noise levels exist for rapid transit systems:

In Car	70-95 dBA
In Station	80-95 dBA
Wayside (at 50 ft.)	80-95 dBA

The ranges found in the MBTA system generally correspond to typical noise ranges for U.S. rapid transit systems.

6. Industrial noise sources—plants, factories, and other industrial activities which represent continuing noise sources for nearby sensitive land uses.

7. Construction activity—a particularly annoying, though temporary, phenomenon, because it often causes sleep interference during early morning hours.

8. Other sources—isolated causes of noise annoyance: excessively loud music or social activity, barking dogs, fire sirens, etc.

No data currently exists on the proportion of residents of the MAPC region currently subject to specific noise levels as no area-wide studies of this kind have been undertaken within the region. Federal, state and local authorities have, however, established criteria of acceptability and impact for different kinds of noise intrusions. For example:

1. The Environmental Protection Agency, mandated by the Noise Control Act of 1972, in 1974 produced two reports containing information on the public health effects of noise. and criteria for acceptable noise levels. EPA's present major responsibilities with respect to noise include establishment of standards for noise control at the source—i.e., in the manufacture of new types of traditionally noisy equipment and vehicles, excluding aircraft.

2. The Federal Aviation Administration has the responsibility for setting noise emission standards for aircraft. Federal Aviation Regulation Part 36 (FAR 36) defines the noise limits new aircraft must meet in order to be certified.

3. The Federal Highway Administration originally promulgated highway noise standards in 1972 (PPM 90-2, now amended to FHPM 7-7-3). These standards established Design Noise Levels to be associated with new Federal-aid highways for different land use types; they also outlined a procedure for handling exceptions to these levels and allocating funds for measures to alleviate highway noise.

4. The Department of Housing and Urban Development in 1971 established criteria and methods for evaluating the noise climate at proposed sites of Federally financed housing, as a requirement for Federal funding of such projects.

5. Locally, the Massachusetts Airport System Plan (1973) recommended that the following goal be adopted by the Commonwealth:

> "The total amount of noise-sensitive area surrounding an airport and currently subjected to unacceptable levels of aircraft noise shall not grow larger than it is today, shall be reduced to half by 1980, and shall be reduced to zero by 1985."

Efforts by the Massachusetts Airport Noise Study Advisory Group (MANSAG), in conjunction with the Mass. Aeronautics Commission, to determine the most feasible way of achieving that goal, have culminated in:

—a detailed study of the noise situation at 8 airports, including proposed alternative actions for reaching the state goal;

—the drafting of a bill, currently before the Massachusetts legislature, which would authorize the adoption of airport noise standards for the Commonwealth and noise abatement plans for particular airports (Logan excluded).

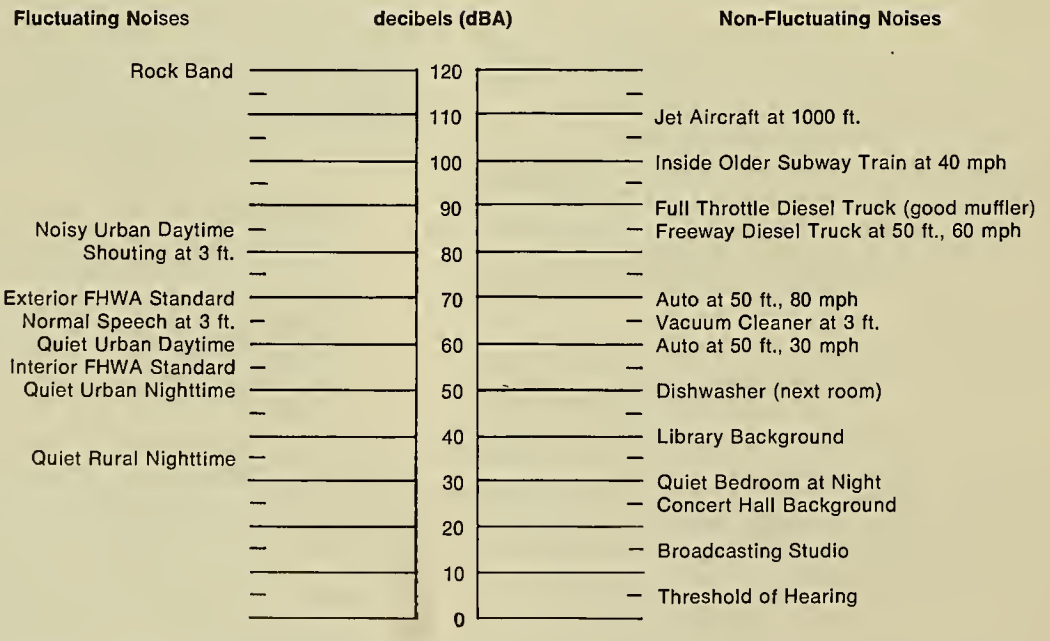
6. The State Department of Environmental Quality Engineering is charged with local responsibility for noise regulation enforcement and investigation of complaints.

7. Municipalities may, on their own initiative, exact noise ordinances limiting allowable noise levels from various sources. Within the region, the city of Boston has a very detailed noise ordinance, which, among other provisions, sets maximum allowable noise levels at property lines which abut different land use types. Newton and Concord also include some "antinuisance"-type noise restrictions in their bylaws.

Figure 4-1

Sound Levels of Common Noises

Commonly experienced kinds of noises and the levels they represent in decibels (dBA) make it easy to understand why noise pollution is such a bothersome and sometimes harmful problem.

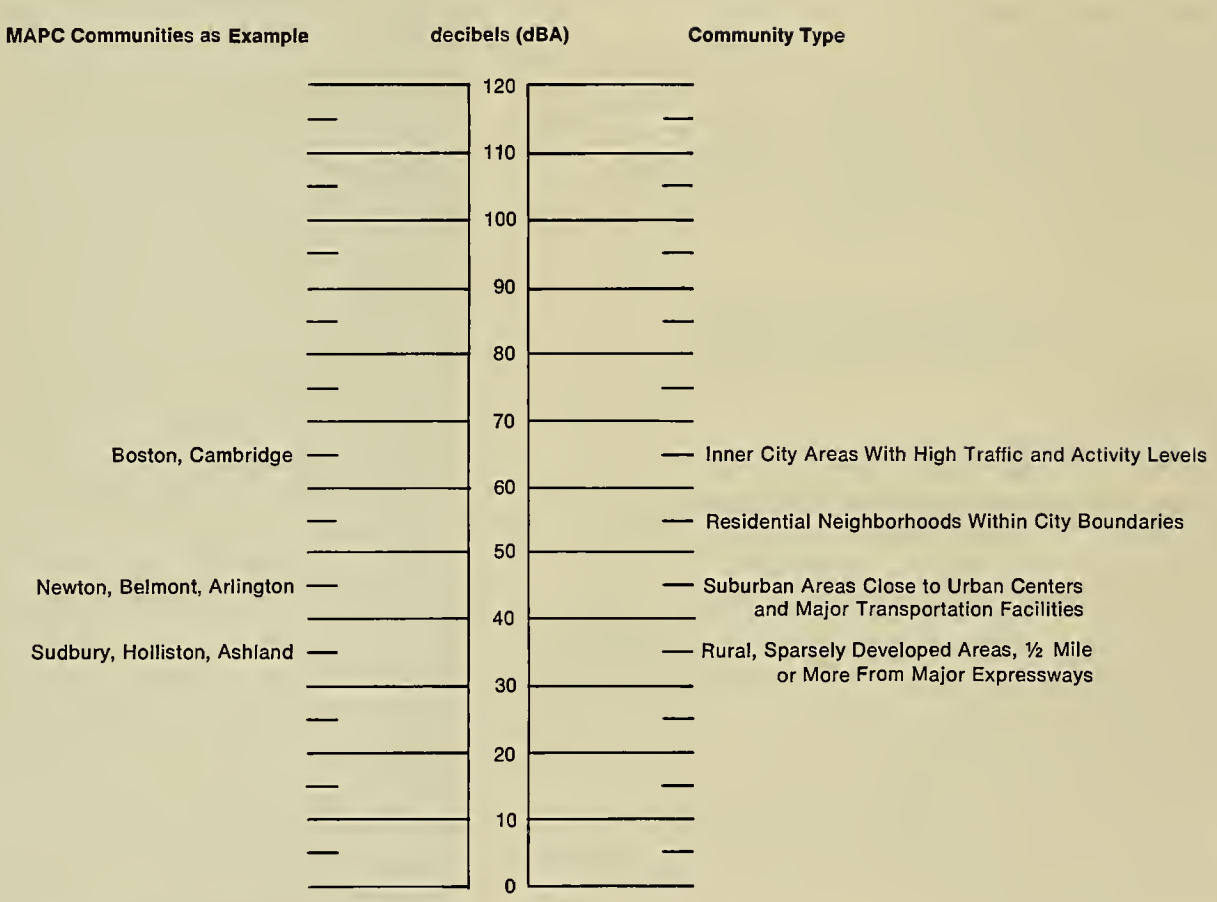


Source: Federal Highway Administration, 1976.

Figure 4-2

General Background Noise Levels by Community Type in the MAPC Region

The amount and type of traffic activity as well as density of development are two major contributors to community noise levels.



Source: Central Transportation Planning Staff, 1977.

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Guidelines for Coordinating Air Quality and Transportation. Boston: United States Environmental Protection Agency Region I, 1977.
Motor Vehicle Inspection and Maintenance. Boston: Massachusetts Department of Environmental Quality Engineering, 1977.
Public Law 95-95. Clean Air Act as Amended in 1977.

* Contains useful maps.

Agency Contacts

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Energy and Environmental Quality Department
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NOISE

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Noise Assessment Guidelines. Washington: U.S. Department of Housing and Urban Development, 1971.
Public Law 92-574. Noise Control Act of 1972.
Report to the President and Congress on Noise. Washington: U.S. Environmental Protection Agency, 1972.
Robinette, Gary O. **Plants/People and Environmental Quality.** Washington: U.S. Department of the Interior, National Park Service, 1972.
Numerous pamphlets are available on the topic and it is suggested that you call MAPC's Energy and Environmental Quality Department for a complete list. (523-2454 ext. 210.)

Agency Contacts

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Logan Airport
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Massachusetts Bay Transportation Authority
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Massachusetts Department of Public Works
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55 Broadway
Cambridge, MA 02142

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MAPC Department of Energy and Environmental Quality.
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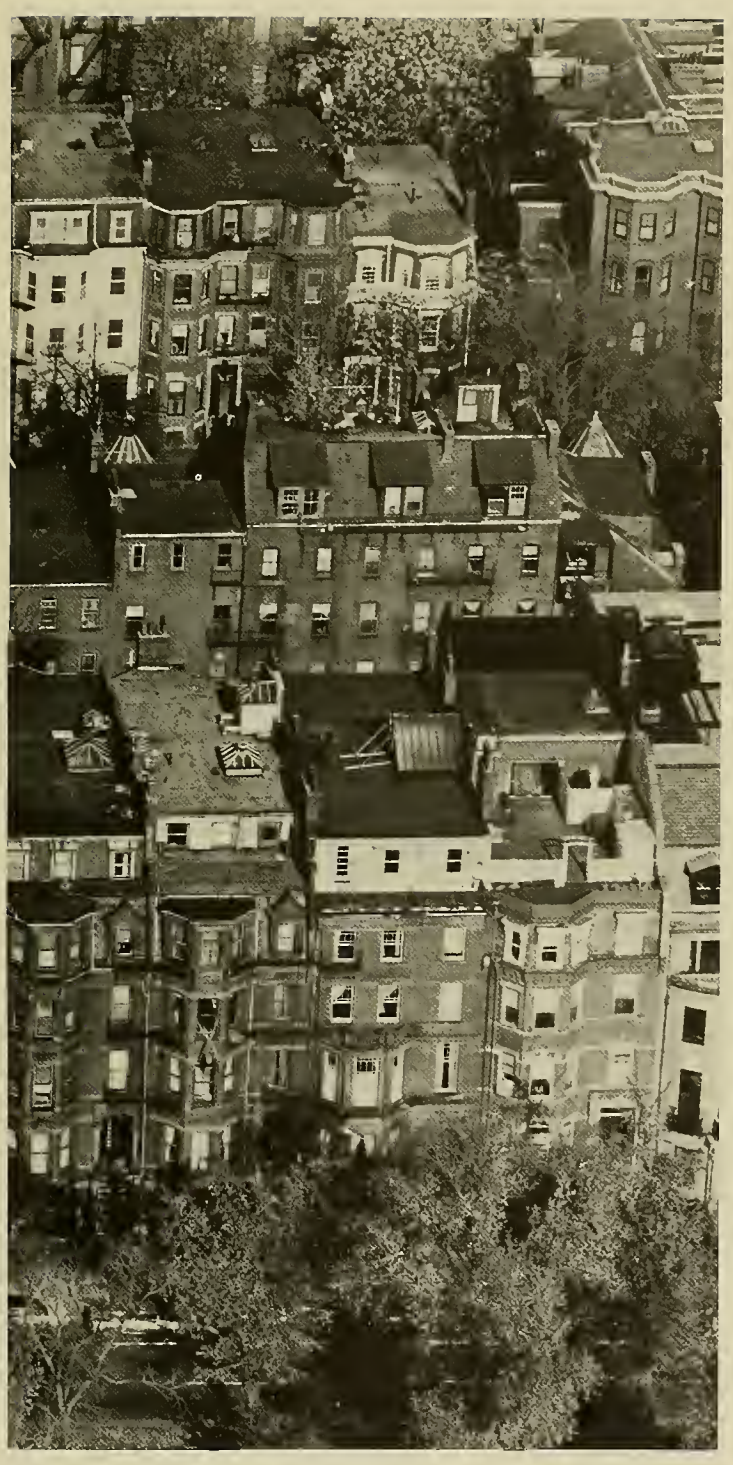


5
HOUSING

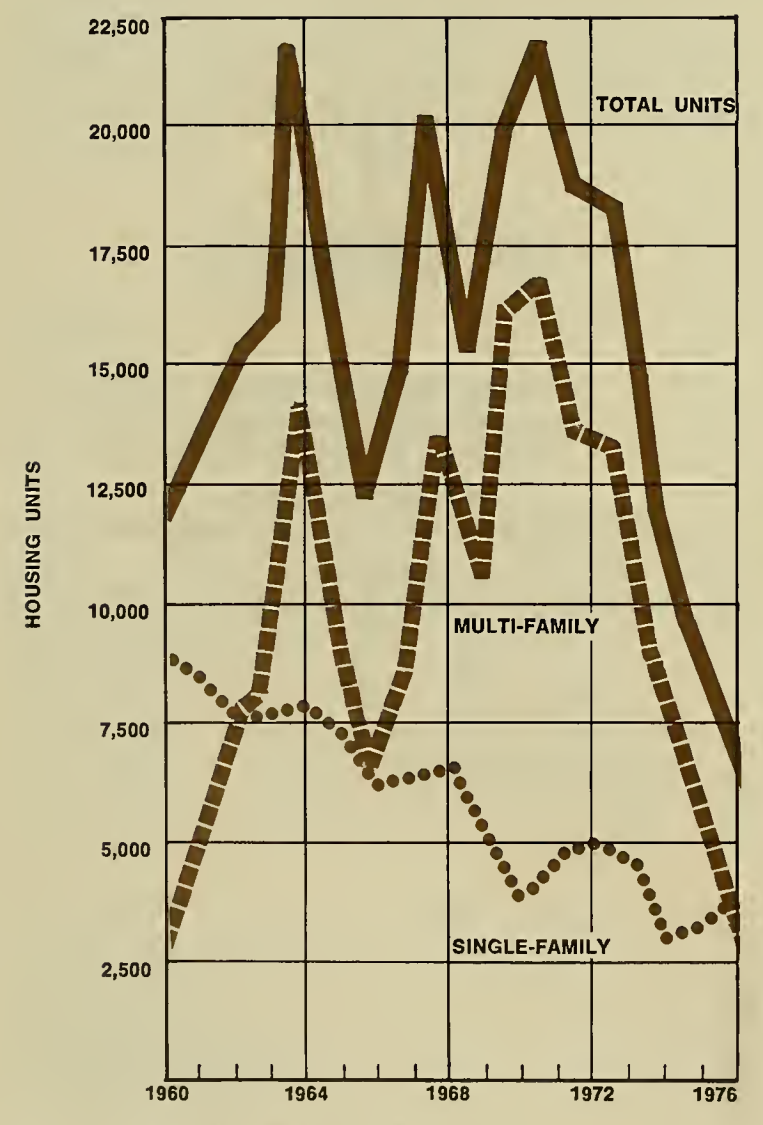
**"Home is a place where,
when you have to go there,
they have to take you in.
I should have called it
something you somehow haven't to deserve."**

—Robert Frost

Figure 5-1

Housing Units Authorized by Permit by Type of Structure in the MAPC Region 1960 through 1976

A review of building permits authorized in the metropolitan Boston region between 1960 and 1976 reveals that both single-family and multifamily housing construction have declined sharply in recent years, with multifamily housing construction declining more dramatically.

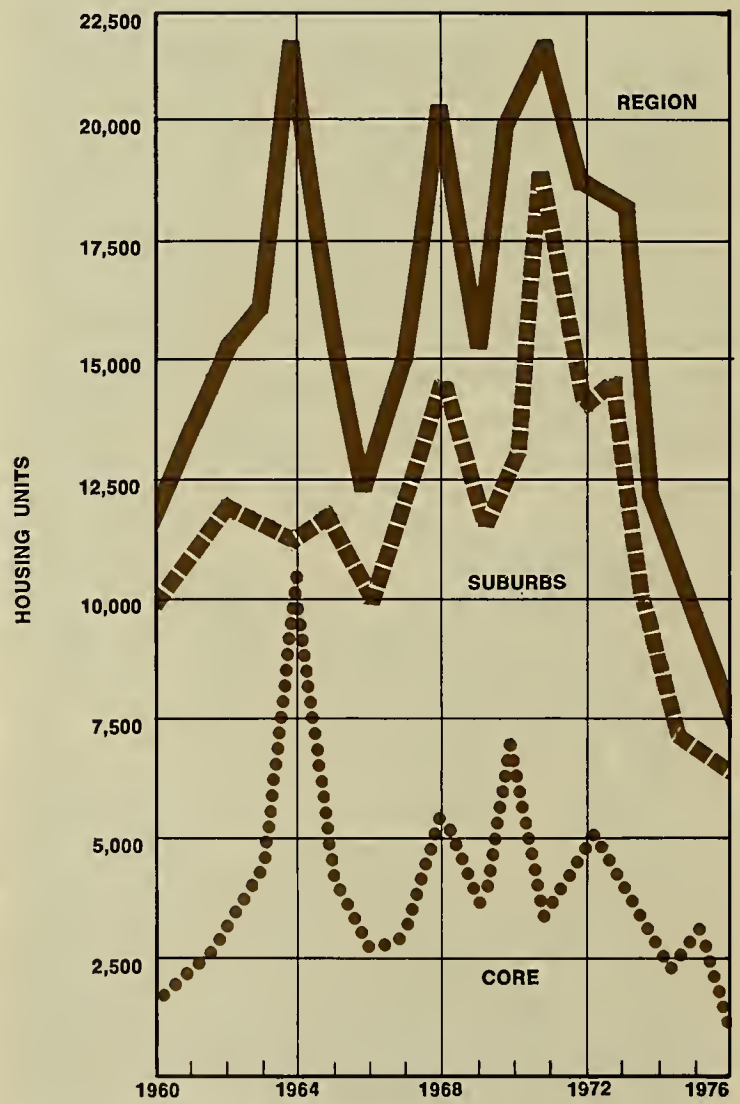


Source: Metropolitan Area Planning Council, 1977.

Figure 5-2

Housing Units Authorized by Permit in MAPC Region

Seventy-five percent of all housing units authorized in the region between 1960 and 1976 were built in suburban communities. Of the single-family housing units authorized, 96 percent were located in the suburbs. Suburban construction also accounted for 62 percent of the multifamily units authorized in the region since 1960.

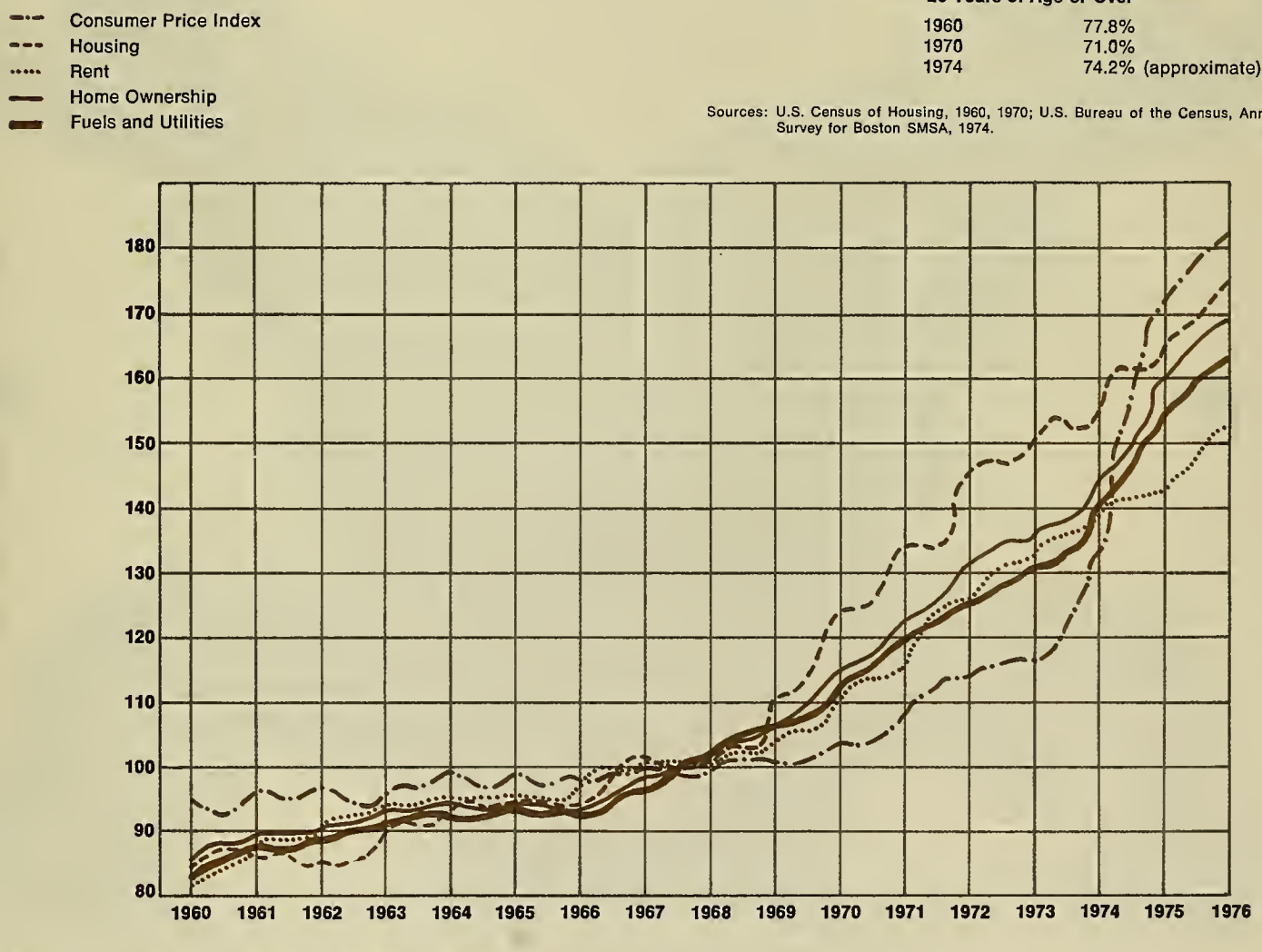


Source: Metropolitan Aree Planning Council, 1977.

Figure 5-3

Trends in the Consumer Price Index for Housing, Housing Related Items and All Items (1967=100)

The U.S. Consumer Price Index includes the price of all consumer items, general housing costs, homeownership, contract rent, fuel and utilities. For the period from 1960 to 1975, the index shows that the homeownership trend which includes purchase, insurance, maintenance and financing costs plus property taxes and fuel, is most consistently divergent from the general price line.



Source: U.S. Department of Labor: Bureau of Labor Statistics, 1960-1976.

Table 5-1

Age of Structures

Substantial housing production during the 1960s and early 1970s resulted in an overall percentage decrease of housing stock over 20 years of age. Since that time housing production has declined, raising the percent of housing units 20 years of age or older. The region then must gear efforts and finance toward rehabilitation and renewal of the region's aging housing stock most vulnerable to fire and abandonment.

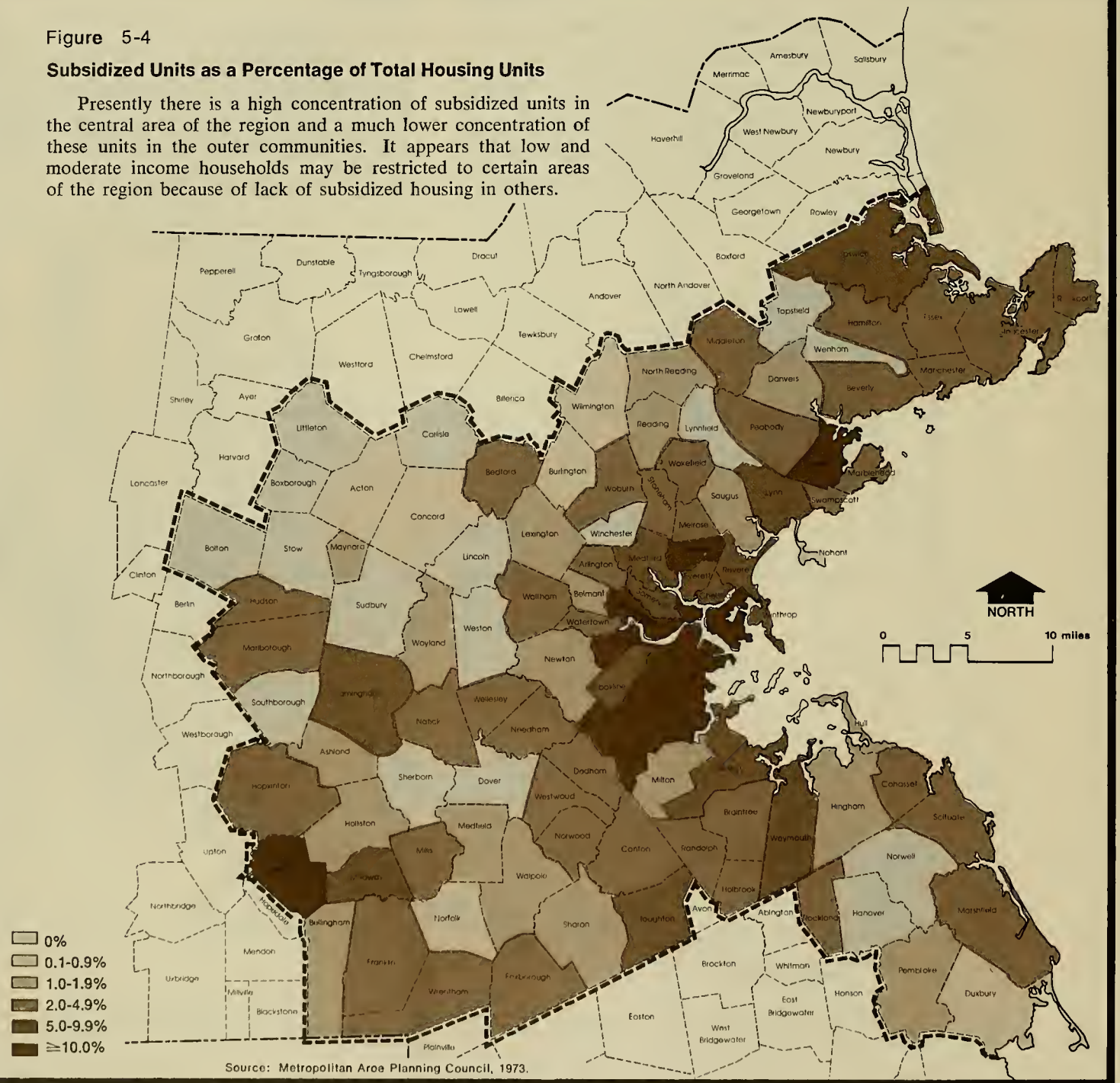
Percent of Housing Units in Boston SMSA 20 Years of Age or Over	
1960	77.8%
1970	71.0%
1974	74.2% (approximate)

Sources: U.S. Census of Housing, 1960, 1970; U.S. Bureau of the Census, Annual Housing Survey for Boston SMSA, 1974.

Figure 5-4

Subsidized Units as a Percentage of Total Housing Units

Presently there is a high concentration of subsidized units in the central area of the region and a much lower concentration of these units in the outer communities. It appears that low and moderate income households may be restricted to certain areas of the region because of lack of subsidized housing in others.

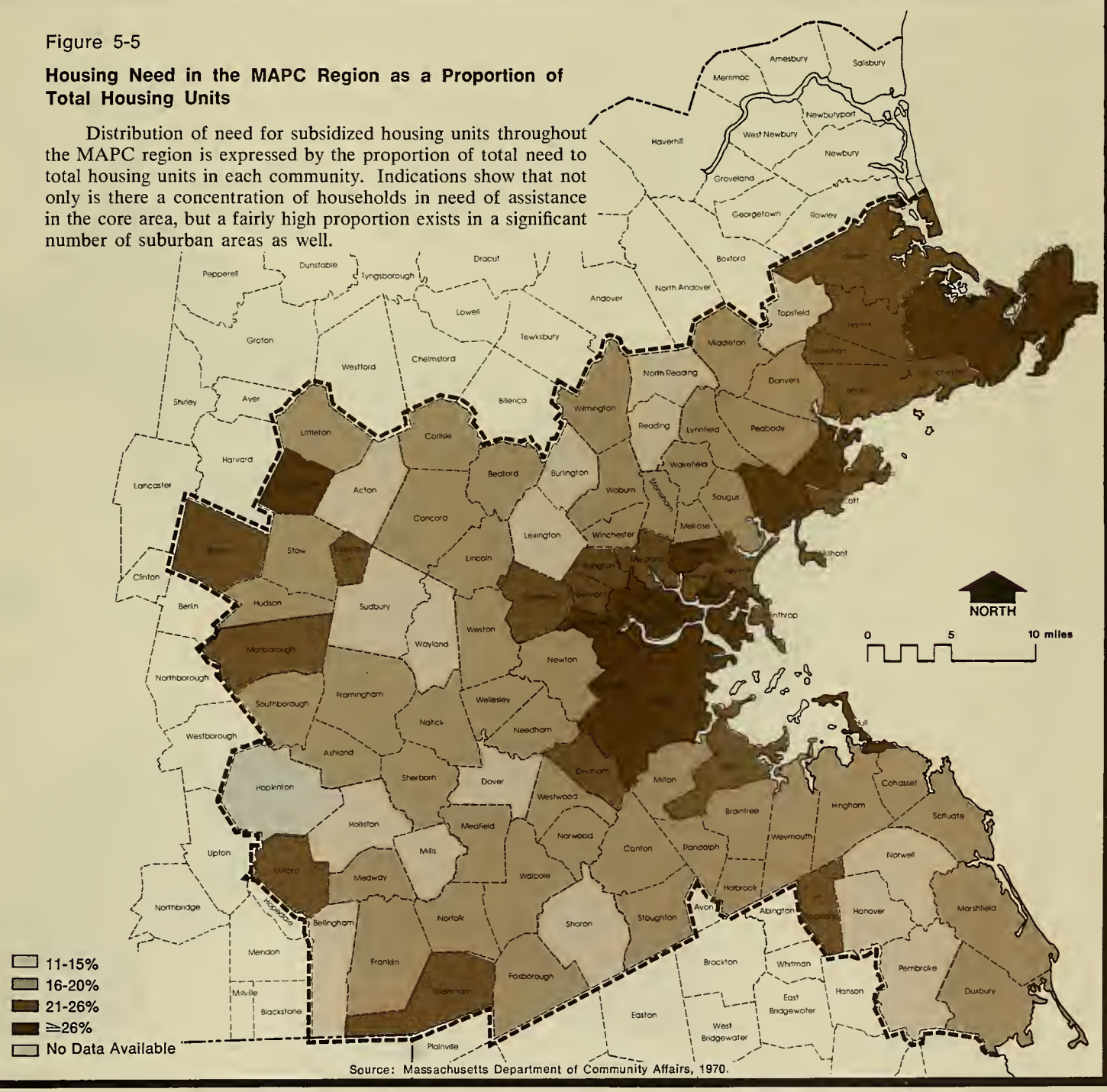


Source: Metropolitan Area Planning Council, 1973.

Figure 5-5

Housing Need in the MAPC Region as a Proportion of Total Housing Units

Distribution of need for subsidized housing units throughout the MAPC region is expressed by the proportion of total need to total housing units in each community. Indications show that not only is there a concentration of households in need of assistance in the core area, but a fairly high proportion exists in a significant number of suburban areas as well.

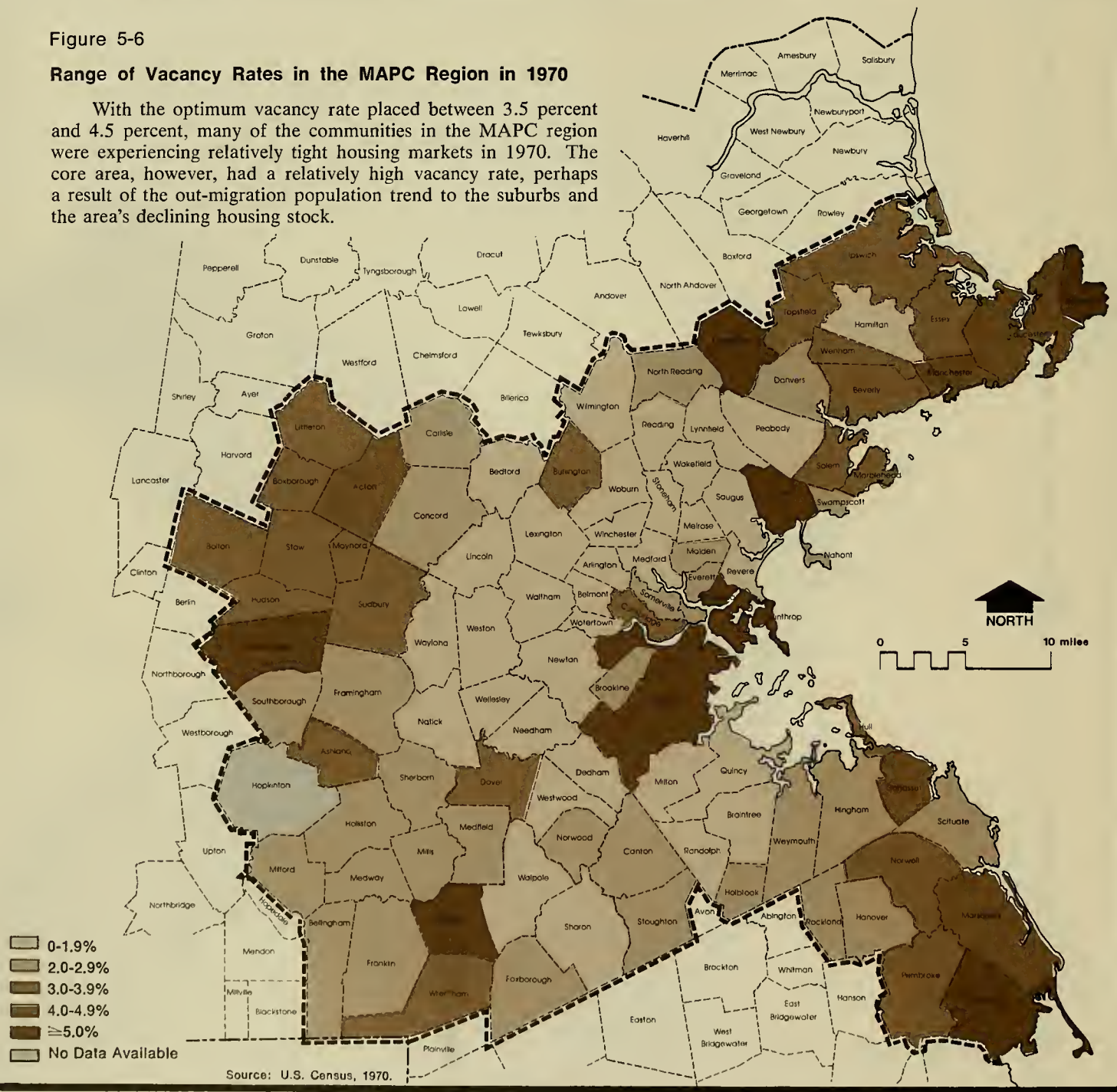


Source: Massachusetts Department of Community Affairs, 1970.

Figure 5-6

Range of Vacancy Rates in the MAPC Region in 1970

With the optimum vacancy rate placed between 3.5 percent and 4.5 percent, many of the communities in the MAPC region were experiencing relatively tight housing markets in 1970. The core area, however, had a relatively high vacancy rate, perhaps a result of the out-migration population trend to the suburbs and the area's declining housing stock.



Source: U.S. Census, 1970.

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MAPC Geographic Base File—DIME Address Coding Guide.[1] 44 School Street, Boston, MA 02108
Maps (in-house reference only)
Community Zoning Information (scale: 1″ = 3000′)
Environmental Pattern I (scale: 1″ = 3000′)
De Facto Pattern (scale: 1″ = 3000′)

* Contains useful maps.
1 The Geographic Base File (GBF) is a computer representation of geographic and census features including streets, railroads, rivers, and town lines. Covering 44 MAPC communities, GBF printouts can be obtained for a fee by contacting MAPC.

Agency Contacts

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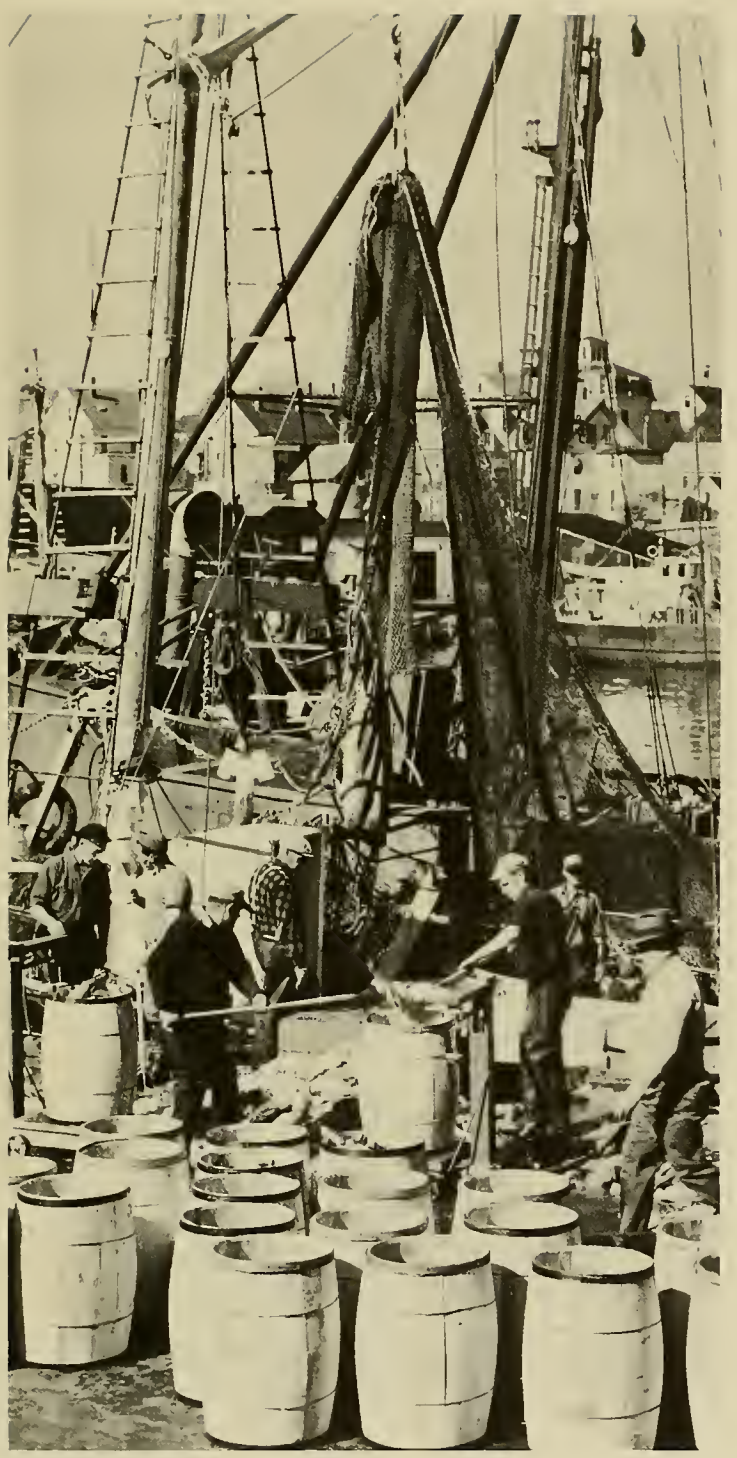


6
ECONOMY AND EMPLOYMENT

"A creative economy is the fuel of magnificence."

—Ralph Waldo Emerson

Table 6-1

Percent of Total Employment by Sector, Area and Year

Total employment in the MAPC region increased 17.2 percent between 1960 and 1975, slightly faster than the 16.8 percent increase in the state over the same period. Among major industry divisions, the region's employment increased in selected services, wholesale and retail trade, government, finance, insurance and real estate between 1960 and 1975. Other employment gains occurred in transportation, communications and public utilities, while manufacturing and construction lost employment during the period.

	MAPC Region			State		
Sector	1960	1975	1990	1960	1975	1990
Goods	30.1	21.5	18.9	36.4	26.6	22.9
Private Services	57.9	63.3	67.8	51.0	57.6	63.2
Government	11.1	14.3	12.9	11.7	14.7	13.4
Agriculture	.9	.9	.4	.9	1.1	.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Metropolitan Area Planning Council, 1977.

Table 6-2

Employment Changes in the MAPC Region, 1970-1975

Analysis of changes in type of employment by community between 1970 and 1975 shows emerging trends for the region. For example, core communities generally lost employment in manufacturing and retail trades, while communities around route 128 gained in these job categories.

Community	Year	Total Employment	Agriculture Forestry Fisheries	Mining	Contract Construction	Manufacturing	Transportation Communications Utilities	Wholesale & Retail Trade	Finance Insurance Real Estate	Services
Acton	1970	2,046	37	16	354	773	50	426	22	368
	1975	3,067	37	12	265	924	83	1,135	104	506
Changes		+1,021	0	—4	—89	+151	+33	+709	+82	+138
Arlington	1970	4,154	89	0	630	431	195	1,608	294	907
	1975	5,466	79	0	447	370	795	1,881	361	1,533
Changes		+1,312	—10	0	—183	—61	+600	+273	+67	+626
Ashland	1970	3,951	32	7	78	2,866	264	554	0	150
	1975	2,277	16	5	74	2,155	337	499	18	172
Changes		—1,674	—16	—2	—4	—711	+73	—55	+18	+22
Bedford	1970	10,231	39	0	92	7,147	59	909	25	1,960
	1975	10,955	18	0	113	7,143	90	1,087	48	2,456
Changes		+724	—21	0	+21	—4	+31	+178	+23	+496

Community	Year	Total Employment	Agriculture Forestry Fisheries	Mining	Contract Construction	Manufacturing	Transportation Communications Utilities	Wholesale & Retail Trade	Finance Insurance Real Estate	Services
Bellingham	1970	1,007	30	0	146	250	21	467	3	89
	1975	1,158	33	0	117	165	23	695	9	116
Changes		+151	+3	0	—29	—85	+2	+228	+6	+27
Belmont	1970	3,300	29	0	407	296	190	1,396	303	680
	1975	3,333	35	0	287	455	253	1,298	272	732
Changes		+33	+6	0	—120	+159	+63	—98	—31	+52
Beverly	1970	8,474	27	0	499	3,672	269	2,799	333	875
	1975	9,832	28	6	385	3,121	336	3,186	326	2,445
Changes		+1,358	+1	+6	—114	—551	+67	+387	—7	+1,570
Bolton	1970	590	1	0	39	299	4	29	0	217
	1975	448	6	0	48	251	18	94	4	29
Changes		—142	+5	0	+9	—48	+14	+65	+4	—188
Boston	1970	376,604	624	27	19,301	62,966	40,849	115,837	68,312	68,688
	1975	379,433	741	39	15,294	49,881	34,170	87,506	59,745	132,057
Changes		+2,829	+117	+12	—4007	—13,085	—6,724	—28,331	—8,567	+63,369
Boxborough	1970	39	2	0	15	0	4	11	0	8
	1975	227	3	8	21	15	8	33	4	137
Changes		+188	+1	+8	+6	+15	+4	+22	+4	+129
Braintree	1970	13,843	16	0	1,217	4,238	491	5,975	329	1,577
	1975	16,734	32	2	1,201	3,621	918	7,636	1,070	2,256
Changes		+2,891	+16	+2	—16	—617	+427	+1,661	+741	+679
Brookline	1970	10,624	55	0	579	416	729	4,216	1,358	3,271
	1975	12,771	46	0	477	249	1,005	4,282	1,928	4,786
Changes		+2,147	—9	0	—102	—167	+276	+66	+570	+1,515
Burlington	1970	14,993	79	13	1,086	3,706	169	3,686	134	6,120
	1975	16,046	63	12	574	4,929	210	5,019	476	4,764
Changes		+1,053	—16	—1	—512	+1,223	+41	+1,333	+342	—1,356
Cambridge	1970	65,678	110	0	3,395	22,249	8,837	18,035	2,383	10,670
	1975	78,471	98	10	2,213	16,562	2,628	15,173	2,257	39,530
Changes		+12,793	—12	+10	—1,182	—5,687	—6,209	—2,862	—126	+28,860
Canton	1970	6,413	34	0	415	2,803	50	2,325	110	675
	1975	9,083	34	0	558	3,757	171	3,404	326	833
Changes		+2,670	0	0	+143	+954	+121	+1,079	+216	+158
Carlisle	1970	161	3	0	8	31	0	14	12	92
	1975	231	7	0	29	40	0	14	7	136
Changes		+70	+4	0	+21	+9	0	0	—5	+44
Chelsea	1970	8,656	2	0	232	3,541	305	3,555	323	698
	1975	8,116	2	0	168	3,049	450	3,137	369	921
Changes		—540	0	0	—64	—492	+145	—418	+46	+223
Cohasset	1970	1,068	11	0	51	62	24	587	56	277
	1975	1,245	7	0	50	101	14	648	63	363
Changes		+177	—4	0	—1	+39	—10	+61	+7	+86
Concord	1970	4,183	30	0	167	1,302	90	1,097	832	666
	1975	6,063	45	0	138	1,881	107	1,112	715	2,056
Changes		+1,880	+15	0	—29	+579	+17	+15	—117	+1,390

Community	Year	Total Employment	Agriculture Forestry Fisheries	Mining	Contract Construction	Manufacturing	Transportation Communications Utilities	Wholesale & Retail Trade	Finance Insurance Real Estate	Services
Danvers	1970	7,726	28	0	422	3,166	102	3,188	86	736
	1975	9,789	35	2	206	3,116	176	4,439	440	1,375
Changes		+2,063	+7	+2	—216	—50	+74	+1,251	+354	+639
Dedham	1970	9,833	55	0	1,386	2,445	165	3,619	773	1,390
	1975	9,071	55	0	645	2,119	395	3,820	670	1,367
Changes		—762	0	0	—741	—326	+230	+201	—103	—23
Dover	1970	200	9	0	32	69	4	69	2	15
	1975	198	17	0	40	5	0	89	7	40
Changes		—2	+8	0	+8	—64	—4	+20	+5	+25
Duxbury	1970	521	13	0	126	17	21	255	4	84
	1975	574	18	0	90	35	46	246	28	112
Changes		+53	+5	0	—36	+18	+25	—9	+24	+28
Essex	1970	398	5	0	11	104	4	252	1	22
	1975	652	5	0	22	194	16	384	1	31
Changes		+254	0	0	+11	+90	+12	+132	0	+9
Everett	1970	9,360	42	0	1,014	3,881	583	1,909	740	1,192
	1975	9,523	18	0	1,148	3,176	672	1,832	375	2,301
Changes		+163	—24	0	+134	—705	+89	—77	—365	+1,109
Foxborough	1970	4,867	3	0	115	3,943	16	538	92	161
	1975	6,401	11	0	117	4,665	64	911	108	524
Changes		+1,534	+8	0	+2	+722	+48	+373	+16	+363
Framingham	1970	22,172	86	34	1,051	9,793	1,184	6,505	801	2,719
	1975	25,549	98	21	1,056	6,516	2,868	8,543	1,141	5,307
Changes		+3,377	+12	—13	+5	—3,277	+1,684	+1,938	+340	+2,588
Franklin	1970	1,976	29	0	255	760	43	540	37	312
	1975	2,397	26	0	129	789	50	752	65	586
Changes		+421	—3	0	—126	+29	+7	+212	+28	+274
Hamilton	1970	396	18	0	80	7	20	165	4	102
	1975	362	14	0	76	1	25	106	13	127
Changes		—34	—4	0	—4	—6	+5	—59	+9	+25
Hanover	1970	1,854	26	0	131	784	63	541	43	266
	1975	3,942	37	0	84	754	55	2,585	61	366
Changes		+2,088	+11	0	—47	—30	—9	+2,044	+18	+100
Hingham	1970	3,754	42	11	188	1,085	153	1,692	100	483
	1975	4,923	58	12	213	1,546	128	2,222	194	551
Changes		+1,169	+16	+1	+25	+461	—25	+530	+94	+68
Holbrook	1970	1,712	31	0	162	376	74	928	17	123
	1975	1,998	20	0	42	476	38	1,233	27	163
Changes		+286	—11	0	—120	+100	—36	+305	+10	+40
Holliston	1970	1,090	8	26	83	529	17	215	19	194
	1975	1,421	13	26	62	704	40	234	24	319
Changes		+331	+5	0	—21	+175	+23	+19	+5	+125
Hopkinton	1970	551	18	0	50	118	34	270	17	44
	1975	903	8	0	139	92	35	482	98	49
Changes		+352	—10	0	+89	—26	+1	+212	+81	+5

Community	Year	Total Employment	Agriculture Forestry Fisheries	Mining	Contract Construction	Manufacturing	Transportation Communications Utilities	Wholesale & Retail Trade	Finance Insurance Real Estate	Services
Hudson	1970	3,362	4	0	214	1,994	47	803	105	196
	1975	3,714	3	0	217	2,129	84	846	160	275
Changes		+352	—1	0	+3	+135	+37	+43	+55	+79
Hull	1970	644	3	0	37	0	75	285	15	229
	1975	696	12	0	18	1	93	334	25	213
Changes		+52	+9	0	—19	+1	+18	+49	+10	—16
Ipswich	1970	1,715	6	10	107	726	30	600	84	153
	1975	1,379	20	3	73	163	51	614	86	369
Changes		—336	+14	—7	—34	—563	+21	+14	+2	+216
Lexington	1970	6,659	67	0	408	1,330	257	1,922	304	2,371
	1975	10,286	70	0	294	3,763	603	2,302	419	2,834
Changes		+3,627	+3	0	—114	+2,433	+346	+380	+115	+463
Lincoln	1970	385	13	0	146	0	5	165	4	52
	1975	451	5	0	35	14	5	125	15	252
Changes		+66	—8	0	—111	+14	0	—40	+11	+200
Littleton	1970	1,198	17	0	27	797	31	266	1	58
	1975	1,112	36	0	29	635	41	286	4	81
Changes		—86	+19	0	+2	—162	+10	+20	+3	+23
Lynn	1970	37,896	42	0	829	21,714	3,088	7,562	1,240	3,422
	1975	31,879	53	0	584	16,670	1,502	6,338	1,038	5,694
Changes		—6,017	+11	0	—245	—5,044	—1,586	—1,224	—202	+2,272
Lynnfield	1970	1,216	22	0	97	13	19	905	14	146
	1975	2,271	33	0	154	157	213	1,293	55	366
Changes		+1,055	+11	0	+57	+144	+194	+388	+41	+220
Malden	1970	14,548	23	39	1,933	4,590	1,174	4,139	688	1,962
	1975	15,181	15	29	1,166	3,191	1,631	3,964	707	4,479
Changes		+633	—8	—10	—767	—1,399	+457	—175	+19	+2,517
Manchester	1970	483	40	0	46	46	21	224	6	101
	1975	577	39	0	50	49	22	266	23	129
Changes		+94	—1	0	+4	+3	+1	+42	+17	+28
Marblehead	1970	2,548	0	0	241	761	74	818	106	549
	1975	2,613	17	0	183	652	83	899	127	653
Changes		+65	+17	0	—58	—109	+9	+81	+21	+104
Marlborough	1970	5,137	16	0	204	2,992	265	1,038	179	444
	1975	7,707	25	0	179	3,358	595	2,092	247	1,211
Changes		+2,570	+9	0	—25	+366	+330	+1,054	+68	+767
Marshfield	1970	1,020	4	0	176	102	45	470	17	205
	1975	1,687	13	0	158	126	97	980	85	227
Changes		+667	+9	0	—18	+24	+52	+510	+68	+22
Maynard	1970	5,237	2	0	25	4,264	12	699	35	200
	1975	6,073	2	0	40	5,023	50	707	73	178
Changes		+836	0	0	+15	+759	+38	+8	+38	—22
Medfield	1970	749	7	0	116	202	25	320	3	76
	1975	810	15	0	38	149	16	351	20	221
Changes		+61	+8	0	—78	—53	—9	+31	+17	+145

Community	Year	Total Employment	Agriculture Forestry Fisheries	Mining	Contract Construction	Manufacturing	Transportation Communications Utilities	Wholesale & Retail Trade	Finance Insurance Real Estate	Services
Medford	1970	10,581	53	0	1,078	2,372	1,129	4,480	172	1,297
	1975	13,070	49	0	970	1,728	1,026	4,530	290	4,477
Changes		+2,489	—4	0	—108	—644	—103	+50	+118	+3,180
Medway	1970	750	1	0	81	187	61	313	21	87
	1975	786	10	0	13	288	31	256	49	139
Changes		+36	+9	0	—68	+101	—30	—57	+28	+52
Melrose	1970	4,076	28	0	299	1,685	106	1,027	102	828
	1975	4,455	16	3	374	786	131	1,121	190	1,835
Changes		+379	—12	+3	+75	—899	+25	+94	+88	+1,007
Middleton	1970	967	30	0	89	551	31	195	8	63
	1975	933	33	3	58	476	41	177	12	134
Changes		—34	+3	+3	—31	—75	+10	—18	+4	+71
Milford	1970	3,606	5	0	99	1,531	118	1,301	176	377
	1975	4,634	4	0	120	1,156	276	1,730	230	1,118
Changes		+1,028	—1	0	+21	—375	+158	+429	+54	+741
Millis	1970	967	1	16	21	664	49	150	6	60
	1975	996	10	16	42	508	47	254	15	105
Changes		+29	+9	0	+21	—156	—2	+104	+9	+45
Milton	1970	1,957	24	1	406	277	139	676	69	365
	1975	2,674	27	0	217	315	284	418	226	1,188
Changes		+717	+3	—1	—189	+38	+145	+258	+157	+823
Nahant	1970	208	2	0	16	4	1	82	4	100
	1975	321	4	0	30	4	1	126	5	152
Changes		+113	+2	0	+14	0	0	+44	+1	+52
Natick	1970	14,068	38	0	506	3,632	198	8,164	346	1,184
	1975	11,403	63	0	367	3,198	217	5,134	415	2,005
Changes		—2,665	+25	0	—139	—434	+19	—3,030	+69	+821
Needham	1970	10,050	134	0	1,271	3,323	97	3,878	236	1,112
	1975	11,093	126	0	1,181	3,541	225	3,995	264	1,761
Changes		+1,043	—8	0	—90	+218	+128	+117	+28	+649
Newton	1970	22,111	161	0	2,145	3,791	583	10,294	1,028	4,109
	1975	30,868	163	0	2,359	3,836	1,349	12,233	1,509	9,419
Changes		+8,757	+2	0	+214	+45	+766	+1,939	+481	+5,310
Norfolk	1970	288	5	0	43	82	51	86	4	17
	1975	364	15	0	19	81	75	111	3	59
Changes		+76	+10	0	—24	—1	+24	+25	—1	+42
North Reading	1970	1,077	12	0	156	78	104	546	9	172
	1975	1,603	13	0	147	90	50	1,011	31	257
Changes		+526	+1	0	—9	+16	—54	+465	+22	+85
Norwell	1970	786	2	0	154	7	18	408	27	168
	1975	1,371	1	0	226	37	26	648	50	383
Changes		+603	—1	0	+72	+30	+8	+240	+23	+215
Norwood	1970	10,818	19	5	550	5,169	301	2,644	935	1,195
	1975	13,356	34	0	503	5,451	356	3,101	990	2,923
Changes		+2,538	+15	—5	—47	+282	+55	+457	+55	+1,728

Community	Year	Total Employment	Agriculture Forestry Fisheries	Mining	Contract Construction	Manufacturing	Transportation Communications Utilities	Wholesale & Retail Trade	Finance Insurance Real Estate	Services
Peabody	1970	11,524	20	46	507	5,128	163	4,323	307	1,030
	1975	11,503	27	2	330	4,341	404	4,211	754	1,434
Changes		—21	+7	—44	—177	—787	+241	—112	+447	+404
Pembroke	1970	622	2	0	92	134	13	259	11	112
	1975	804	5	0	99	161	13	354	32	140
Changes		+182	+3	0	+7	+27	0	+95	+21	+28
Quincy	1970	32,424	25	10	1,557	14,082	1,566	10,368	1,516	3,300
	1975	28,124	17	14	1,395	9,385	1,262	8,699	3,397	3,955
Changes		—4,300	—8	+4	—162	—4,697	—304	—1,669	+1,881	+655
Randolph	1970	4,830	12	0	297	2,379	96	1,475	118	454
	1975	5,953	9	0	236	2,143	117	2,584	141	723
Changes		+1,123	—3	0	—61	—236	+21	+1,109	+23	+269
Reading	1970	3,072	24	0	344	1,081	83	869	83	589
	1975	3,597	26	0	242	826	108	1,464	169	763
Changes		+525	+2	0	—102	—255	+25	+595	+86	+174
Revere	1970	5,500	63	0	300	530	191	2,922	47	1,447
	1975	6,089	37	0	270	420	331	3,363	82	1,585
Changes		+589	—26	0	—30	—110	+140	+441	+35	+138
Rockland	1970	3,864	8	0	120	1,476	23	1,510	316	411
	1975	3,517	9	6	114	1,353	117	1,083	308	526
Changes		—347	+1	+6	—6	—123	+94	—427	—8	+115
Rockport	1970	869	7	0	114	149	36	329	49	185
	1975	1,023	12	0	63	197	17	464	41	229
Changes		+154	+5	0	—51	+48	—19	+135	—8	+44
Salem	1970	13,953	22	0	941	5,301	793	4,023	869	2,004
	1975	15,663	29	0	509	4,833	1,176	4,621	834	3,641
Changes		+1,710	+7	0	—432	—468	+383	+598	—35	+1,637
Saugus	1970	5,356	11	0	362	553	112	3,564	64	688
	1975	6,402	10	0	347	478	234	4,484	110	739
Changes		+1,046	—1	0	—15	—75	+122	+920	+46	+51
Scituate	1970	1,275	10	0	157	147	28	605	49	280
	1975	1,800	5	0	111	267	56	908	90	363
Changes		+525	—5	0	—46	+120	+28	+303	+41	+83
Sharon	1970	1,483	0	0	271	485	76	430	8	213
	1975	903	2	0	64	127	41	354	44	271
Changes		—580	+2	0	—207	—358	—35	—76	+36	+58
Sherborn	1970	146	10	0	23	41	15	18	23	16
	1975	133	14	0	19	27	12	32	8	21
Changes		—13	+4	0	—4	—14	—3	+14	—15	+5
Somerville	1970	17,801	29	0	1,155	4,304	1,500	7,638	342	2,832
	1975	16,332	19	0	1,131	3,395	1,474	6,080	464	3,770
Changes		—1,469	—10	0	—24	—909	—26	—1,558	+122	+938
Southborough	1970	1,124	7	0	105	246	169	553	11	34
	1975	2,977	5	0	156	2,061	209	464	10	72
Changes		+1,853	—2	0	+51	+1,815	+40	—89	—1	+38

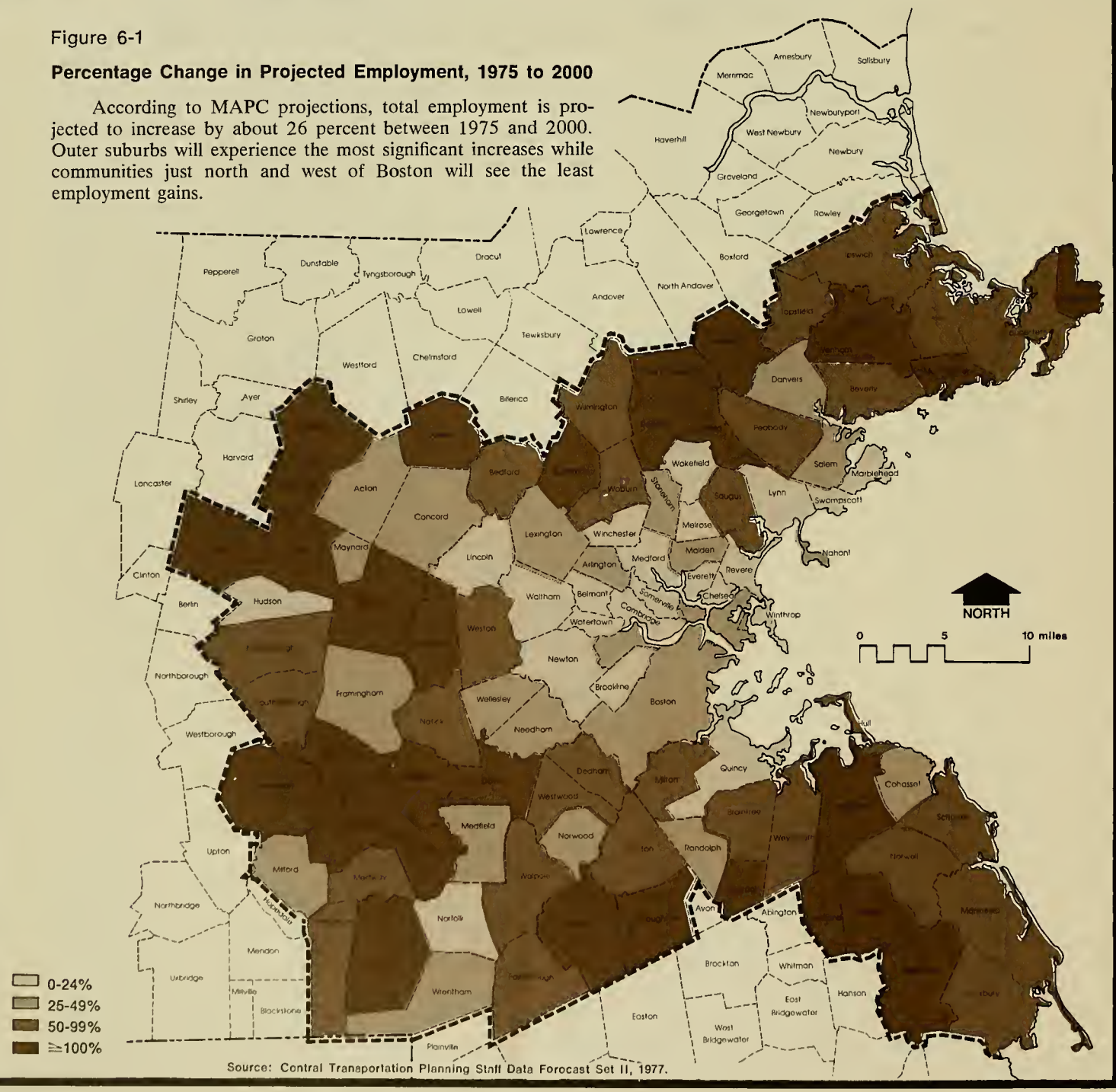
Community	Year	Total Employment	Agriculture Forestry Fisheries	Mining	Contract Construction	Manufacturing	Transportation Communications Utilities	Wholesale & Retail Trade	Finance Insurance Real Estate	Services
Stoneham	1970	3,244	23	0	143	830	59	1,454	67	669
	1975	6,604	25	0	103	1,120	67	3,391	124	1,774
Changes		+3,360	+2	0	—40	+290	+8	+1,937	+57	+1,105
Stoughton	1970	3,705	12	0	298	1,887	134	866	44	465
	1975	5,407	15	0	270	1,752	269	1,600	144	1,358
Changes		+1,702	+3	0	—28	—135	+135	+734	+100	+893
Stow	1970	312	0	0	64	67	15	108	0	58
	1975	430	0	0	88	58	18	153	1	111
Changes		+118	0	0	+24	—9	+3	+45	+1	+53
Sudbury	1970	3,208	45	0	232	1,690	9	878	16	338
	1975	3,892	33	0	120	1,954	7	1,088	60	629
Changes		+684	—12	0	—112	+264	—2	+210	+44	+291
Swampscott	1970	1,538	48	0	122	102	40	932	35	260
	1975	1,768	46	0	177	96	56	900	78	415
Changes		+230	—2	0	+55	—6	+16	—32	+43	+155
Topsfield	1970	433	2	0	38	91	6	213	11	74
	1975	561	4	0	55	154	11	198	23	117
Changes		+128	+2	0	+17	+63	+5	—15	+12	+43
Wakefield	1970	8,389	21	0	538	3,411	169	1,303	1,869	1,078
	1975	8,078	25	0	414	2,390	190	2,564	1,251	1,243
Changes		—311	+4	0	—124	—1,021	+21	+1,261	—618	+165
Walpole	1970	5,375	12	17	262	3,138	222	1,400	91	232
	1975	5,999	12	35	153	2,943	570	1,810	116	361
Changes		+624	0	+18	—109	—195	+348	+410	+25	+129
Waltham	1970	39,725	139	1	1,218	22,824	1,177	7,884	1,197	5,285
	1975	45,328	108	1	927	24,098	1,186	8,867	1,412	8,730
Changes		+5,603	—31	0	—291	+1,274	+9	+983	+215	+3,445
Watertown	1970	13,173	140	0	626	4,616	1,933	3,837	483	1,539
	1975	12,632	119	0	508	5,743	1,368	2,672	533	1,689
Changes		—541	—21	0	—118	+1,127	—565	—1,165	+50	+150
Wayland	1970	4,243	6	0	581	2,770	14	573	17	282
	1975	3,359	43	0	337	1,610	14	900	22	434
Changes		—884	+37	0	—244	—1,160	0	+327	+5	+152
Wellesley	1970	7,339	55	0	676	992	99	3,038	910	1,568
	1975	8,827	64	0	457	676	347	2,754	1,045	3,484
Changes		+1,488	+9	0	—219	—316	+248	—284	+135	+1,916
Wenham	1970	135	19	0	24	2	0	64	0	25
	1975	377	16	0	25	17	1	115	1	203
Changes		+242	—3	0	+1	+15	+1	+51	+1	+178
Weston	1970	1,564	37	0	212	48	26	760	17	464
	1975	1,915	51	0	243	66	49	472	51	983
Changes		+351	+14	0	+31	+18	+23	—288	+34	+519
Westwood	1970	2,603	5	0	305	364	378	992	45	514
	1975	3,454	23	0	237	657	341	1,410	179	606
Changes		+851	+18	0	—68	+293	—37	+418	+134	+92

Community	Year	Total Employment	Agriculture Forestry Fisheries	Mining	Contract Construction	Manufacturing	Transportation Communications Utilities	Wholesale & Retail Trade	Finance Insurance Real Estate	Services
Weymouth	1970	6,314	120	15	618	779	572	2,786	205	1,220
	1975	7,558	117	6	612	823	683	2,676	297	2,343
Changes		+1,244	—3	—9	—6	+44	+111	—110	+92	+1,123
Wilmington	1970	8,164	225	0	237	3,223	69	1,337	83	2,991
	1975	9,440	345	6	187	3,988	223	1,712	81	2,899
Changes		+1,276	+120	+6	—50	+765	+154	+375	—2	—92
Winchester	1970	2,691	22	0	479	851	58	602	115	563
	1975	3,817	23	0	337	822	393	575	164	1,504
Changes		1,126	+1	0	—142	—29	+335	—27	+49	+941
Winthrop	1970	1,201	3	0	215	108	81	375	30	389
	1975	1,735	1	0	317	165	84	444	54	669
Changes		+534	—2	0	+102	+57	+3	+69	+24	+280
Woburn	1970	9,302	16	1	574	4,225	420	3,091	238	735
	1975	12,086	43	0	615	4,489	782	3,573	292	2,292
Changes		+2,784	+27	—1	+41	+264	+362	+482	+54	+1,557
Wrentham	1970	1,109	7	0	161	455	55	194	13	224
	1975	1,141	15	0	90	483	43	292	21	197
Changes		+32	+8	0	—71	+28	—12	—98	+8	—27

Figure 6-1

Percentage Change in Projected Employment, 1975 to 2000

According to MAPC projections, total employment is projected to increase by about 26 percent between 1975 and 2000. Outer suburbs will experience the most significant increases while communities just north and west of Boston will see the least employment gains.



Source: Central Transportation Planning Staff Data Forecast Set II, 1977.

Table 6-3

Average Annual Unemployment Rate for the Boston SMSA

The average annual unemployment rate for the Boston SMSA, relatively low in 1970, had increased sharply by 1975. In 1976, unemployment rates began to show a decline from the 1975 high and present economic trends indicate that unemployment will decline further in 1978.

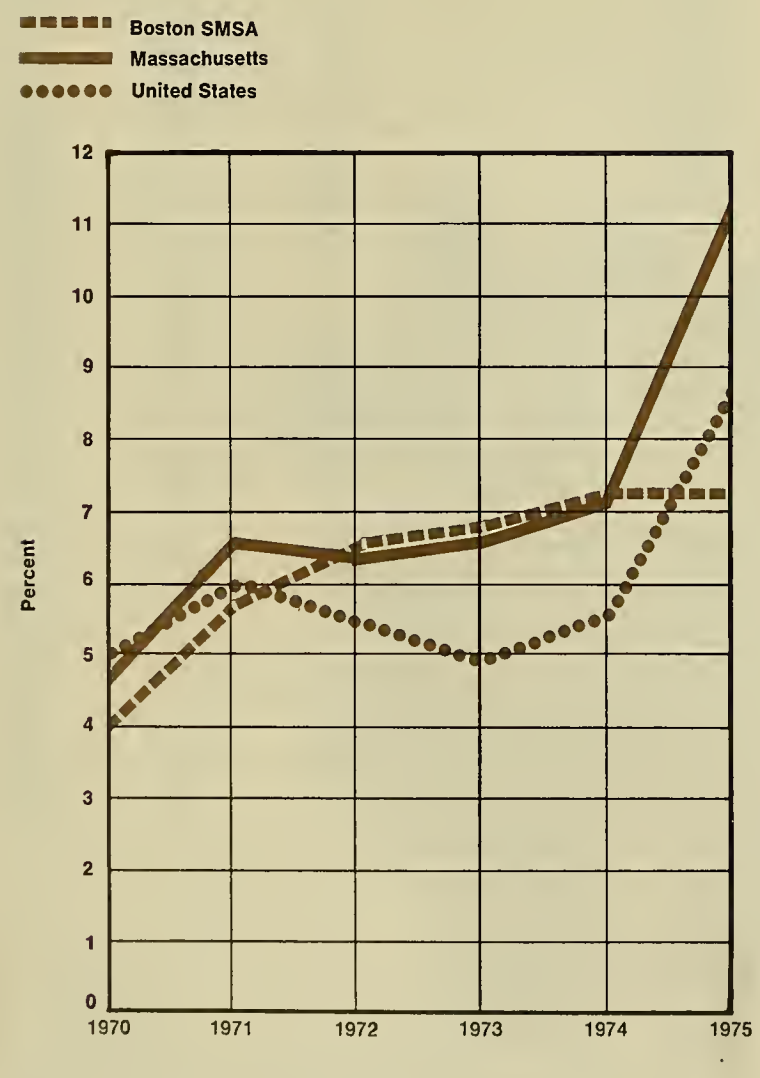
Community	1970	1975	1976
Acton	2.8	7.6	6.3
Arlington	3.1	8.3	7.0
Ashland	3.0	8.3	6.8
Bedford	2.7	7.3	6.2
Bellingham	4.4	11.6	9.9
Belmont	2.8	7.7	6.4
Beverly	3.7	10.0	8.4
Boston	4.9	12.8	10.9
Boxborough	2.0	5.5	4.9
Braintree	3.5	9.3	7.9
Brookline	2.8	7.7	6.4
Burlington	3.3	8.8	7.4
Cambridge	4.5	11.9	10.1
Canton	2.6	7.2	6.0
Carlisle	2.3	6.1	4.8
Chelsea	4.3	11.3	9.6
Cohasset	1.9	5.3	4.4
Concord	3.7	10.0	8.4
Danvers	2.7	7.4	6.2
Dedham	2.9	7.8	6.6
Dover	3.7	9.9	8.3
Duxbury	4.8	12.6	10.5
Everett	5.2	13.5	11.5
Foxborough	3.7	9.9	8.2
Framingham	3.0	8.3	7.0
Franklin	3.2	8.8	7.5
Hamilton	1.9	5.3	4.2
Hanover	3.9	10.5	8.8
Hingham	3.5	9.4	7.9
Holbrook	6.2	15.9	13.5
Holliston	3.0	8.2	6.8
Hull	5.3	13.9	12.0
Lexington	2.8	7.7	6.4
Lincoln	1.6	4.3	3.5
Lynn	4.8	12.5	10.6
Lynnfield	3.3	8.9	7.4
Malden	4.0	10.6	8.9
Manchester	3.2	8.9	7.5
Marblehead	3.1	8.4	7.0
Marshfield	5.0	13.2	11.2
Medfield	2.6	7.0	6.0
Medford	3.5	9.5	8.0
Medway	5.2	13.6	11.6
Melrose	3.2	8.6	7.3
Middleton	3.6	9.8	8.2
Millis	5.7	14.8	12.9
Milton	3.0	8.2	6.9
Nahant	4.2	11.2	9.9
Natick	2.8	7.6	6.4
Needham	2.9	7.9	6.7
Newton	3.1	8.5	7.1
Norfolk	2.0	5.5	4.5
North Reading	3.0	8.1	6.9
Norwell	2.3	6.4	5.5
Norwood	3.0	8.1	6.8
Peabody	3.6	9.7	8.2
Pembroke	3.9	10.6	9.0
Quincy	4.1	11.0	9.3
Randolph	3.0	8.1	6.9
Reading	2.7	7.3	6.2
Revere	5.5	14.4	12.2
Rockland	4.6	12.1	10.3
Salem	4.6	12.1	10.3
Saugus	3.7	10.0	8.5
Scituate	3.7	10.0	8.4
Sharon	3.0	8.2	6.9
Sherborn	2.9	7.9	6.9
Somerville	4.9	12.9	10.9
Stoneham	4.2	11.2	9.4
Stoughton	5.1	13.3	11.3
Sudbury	3.1	8.4	7.1
Swampscott	3.5	9.5	7.9
Topsfield	2.5	6.8	6.1
Wakefield	4.2	11.3	9.5
Walpole	2.7	7.4	6.3
Waltham	3.4	9.2	7.7
Watertown	4.0	10.8	9.1
Wayland	2.8	7.6	6.3
Wellesley	2.4	6.6	5.6
Wenham	2.0	5.5	4.2
Weston	2.5	6.8	5.5
Westwood	1.2	3.5	2.9
Weymouth	3.1	8.5	7.2
Wilmington	4.3	11.4	9.7
Winchester	3.3	9.0	7.5
Winthrop	4.5	11.9	10.1
Woburn	3.7	9.9	8.4
Wrentham	2.2	6.1	5.1

Source: Massachusetts Department of Employment Security, 1977.

Figure 6-2

Unemployment Rate in the U.S., Massachusetts and Boston SMSA from 1970 to 1975

Substantial unemployment is defined by the U.S. Department of Labor as a level above 6 percent. The unemployment rate in the Boston SMSA has been above that level since 1972, while it was not until 1975 that the national average passed the 6 percent level. However, the Boston SMSA had a lower unemployment rate in 1975 at 7.2 percent than Massachusetts as a whole with 11.2 percent.



Source: U.S. Department of Labor Statistic, 1976.

Table 6-4

Per Capita Income for Communities in the MAPC Region Standardized on 1967 Dollars

A comparison of per capital income in 1969 and 1974 (in standardized 1967 dollars) shows that incomes increased in communities in the MAPC region during the period. This follows a nationwide trend toward higher incomes.

Community	Per Capita Income Standardized 1969	Per Capita Income Standardized 1974
Acton	$3,763	$4,110
Arlington	3,629	3,748
Ashland	2,941	3,180
Bedford	3,535	3,681
Bellingham	2,525	2,740
Belmont	4,772	4,700
Beverly	3,161	3,392
Bolton	3,330	3,568
Boston	2,763	2,796
Boxborough	3,226	3,565
Braintree	3,272	3,490
Brookline	5,574	5,172
Burlington	2,887	3,172
Cambridge	3,542	3,549
Canton	3,405	3,640
Carlisle	4,666	4,860
Chelsea	2,587	2,661
Cohasset	4,566	4,661
Concord	4,773	4,985
Danvers	3,021	3,153
Dedham	3,455	3,572
Dover	6,758	6,200
Duxbury	4,006	3,944
Essex	3,092	2,787
Everett	2,873	2,553
Foxborough	2,876	3,118
Framingham	3,595	3,736
Franklin	2,581	2,753
Gloucester	2,922	3,114
Hamilton	3,628	3,636
Hanover	3,065	3,176
Hingham	3,849	4,028
Holbrook	2,746	2,956
Holliston	3,236	3,522
Hopkinton	3,157	3,356
Hudson	2,795	2,971
Hull	2,758	2,924
Ipswich	3,065	3,182
Lexington	4,513	4,533
Lincoln	5,065	4,966
Littleton	3,104	3,346
Lynn	2,785	2,975
Lynnfield	4,391	4,432
Malden	2,943	3,084
Manchester	4,132	3,930
Marblehead	4,899	4,996
Marlborough	2,985	3,122
Marshfield	3,204	3,361
Maynard	2,936	3,046
Medfield	3,595	3,944
Medford	3,039	3,147
Medway	2,719	2,925
Melrose	3,452	3,515
Middleton	2,741	2,892
Milford	2,814	2,981
Millis	3,090	3,522
Milton	4,460	4,442
Nahant	3,679	4,005
Natick	3,465	3,671
Needham	4,554	4,714
Newton	4,895	4,794
Norfolk	2,565	2,901
North Reading	2,994	3,163
Norwell	3,509	3,835
Norwood	3,411	3,636
Peabody	3,084	3,227
Pembroke	2,708	2,806
Quincy	3,167	3,401
Randolph	3,047	3,248
Reading	3,555	3,711
Revere	2,936	3,021
Rockland	2,482	2,599
Rockport	3,565	3,755
Salem	2,743	2,515
Saugus	3,024	3,160
Scituate	3,375	3,464
Sharon	3,901	4,179
Sherborn	4,350	4,534
Somerville	2,713	2,877
Southborough	3,685	3,840
Stoneham	3,495	3,578
Stoughton	2,835	3,198
Stow	3,373	3,736
Sudbury	3,961	4,265
Swampscott	4,675	4,527
Topsfield	3,876	4,034
Wakefield	3,450	3,605
Walpole	3,256	3,443
Waltham	3,022	3,193
Watertown	3,309	3,514
Wayland	4,581	3,952
Wellesley	5,437	5,285
Wenham	4,438	4,794
Weston	6,599	6,462
Westwood	4,672	4,734
Weymouth	3,006	3,274
Wilmington	2,693	2,850
Winchester	4,765	4,821
Winthrop	3,156	3,274
Woburn	2,989	3,155
Wrentham	2,356	2,480

Source: Massachusetts Bay Transportation Authority Advisory Board, 1976.

Table 6-5

Number of Families by Income Type for Communities in the MAPC Region with 1970 Population of 10,000 or More

Generally, families fall into three income categories: 1) wage or salary, 2) social security, and 3) public assistance or welfare. Table 6-6 shows the number of families in each of these categories for communities in the MAPC region with a population of 10,000 or greater. A comparison among communities reveals those with the largest public assistance burden.

Community	Total Number of Families with Wage or Salary Income	Families with Social Security Income	Families with Public Assistance or Public Welfare Income	Total Families
TOWNS				
Acton	3,454	301	49	3,566
Arlington	12,719	3,356	448	14,419
Bellingham	3,007	517	136	3,250
Belmont	6,798	2,125	184	7,876
Braintree	8,004	1,600	238	8,581
Brookline	12,104	3,863	426	14,215
Burlington	4,770	525	115	5,028
Canton	3,771	681	133	4,088
Concord	3,433	646	53	3,757
Danvers	5,632	891	293	6,067
Dedham	6,020	1,217	261	6,656
Foxborough	3,010	512	81	3,267
Framingham*				
Franklin	3,625	594	147	3,912
Hanover	2,244	287	124	2,417
Hingham	4,058	736	146	4,500
Holbrook	2,633	412	106	2,758
Holliston	2,735	329	61	2,858
Hudson	3,543	643	118	3,811
Ipswich	2,500	542	102	2,756
Lexington	7,192	1,089	131	7,825
Lynnfield	2,489	431	22	2,781
Marblehead	4,941	1,119	150	5,673
Marshfield	3,223	495	143	3,578
Milford	4,631	1,201	207	5,122
Milton	6,013	1,864	108	6,825
Natick	7,087	1,322	260	7,591
Needham	6,834	1,223	123	7,583
North Reading	2,522	321	75	2,705
Norwood	6,947	1,383	311	7,540
Pembroke	2,461	345	121	2,723
Randolph	6,058	1,027	255	6,559
Reading	5,065	976	154	5,503
Rockland	3,232	629	132	3,559
Saugus	5,868	1,363	285	6,453
Scituate	3,551	624	108	3,978
Sharon	2,865	420	81	3,092
Stoneham	4,813	1,029	209	5,224
Stoughton	5,250	896	280	5,667
Sudbury	2,949	326	51	3,131
Swampscott	3,032	833	101	3,633
Wakefield	5,941	1,434	167	6,492
Walpole	3,879	692	94	4,178
Watertown	9,439	2,563	393	10,412
Wayland	3,052	358	65	3,273
Wellesley	5,695	1,241	88	6,402
Weston	2,264	361	19	2,563
Westwood	2,965	516	21	3,238
Weymouth	12,356	2,590	605	13,515
Wilmington	3,684	650	120	4,006
Winchester	4,942	967	131	5,545
Winthrop	4,451	1,277	205	5,044
CITIES				
Beverly	8,391	1,765	548	9,376
Boston	122,242	32,635	19,578	142,019
Cambridge	18,604	4,394	1,576	20,902
Chelsea	6,434	1,878	857	7,470
Everett	10,304	2,861	848	11,440
Gloucester	6,195	1,764	562	7,101
Lynn	19,476	5,579	2,686	22,471
Malden	13,098	3,523	1,023	14,607
Marlborough	6,542	1,203	301	7,041
Medford	14,637	4,072	920	16,317
Melrose	7,391	1,856	276	8,219
Newton	20,002	4,836	462	22,694
Peabody	11,131	2,133	485	12,220
Quincy	20,120	5,368	1,066	22,496
Revere	10,230	2,535	747	11,509
Salem	9,090	2,329	625	10,188
Somerville	19,707	5,427	1,841	22,172
Waltham	12,845	2,814	554	14,155
Woburn	8,441	1,587	328	9,010

Source: U.S. Census, 1970.
* Information not available.

Table 6-6

Family income and retail sales receipts by community indicate where money is being spent and where money is being made in the MAPC region. Examination of this data also reveals the location of the region's trade centers.

Table 6-6

Aggregate Family Income for 1970 and 1976, and Retail Sales Receipts for 1972 for the MAPC Region

Community	Aggregate Family Income in 1970 (millions)[1]	Aggregate Family Income in 1976 (millions)[2]	Retail Sales Receipts in 1972 (millions)[3]
TOWNS			
Acton	$62.	$115.	$35.6
Arlington	214.	261.	74.2
Ashland	29.	49.	15.3
Bedford	53.	96.	28.9
Bellingham	39.	66.	26.8
Belmont	148.	166.	43.2
Bolton	7.	12.	*
Boxborough**	*	*	*
Braintree	126.	188.	195.5
Brookline	355.	477.	101.0
Burlington	70.	135.	128.3
Canton	65.	97.	56.3
Carlisle	15.	27.	
Cohasset	35.	58.	25.4
Concord	86.	163.	39.7
Danvers	86.	143.	134.4
Dedham	109.	179.	142.6
Dover	34.	68.	*
Duxbury	34.	63.	*
Essex**	*	*	*
Foxborough	45.	77.	31.7
Framingham	253.	359.	214.4
Franklin	51.	77.	31.2
Hamilton	25.	36.	6.5
Hanover	34.	61.	57.8
Hingham	80.	132.	67.0
Holbrook	36.	55.	19.3
Holliston**	*	*	8.3
Hopkinton**	*	*	*
Hudson**	*	*	32.8
Hull	31.	55.	8.7
Ipswich**	*	*	20.2
Lexington	130.	205.	56.8
Lincoln	42.	80.	6.8
Littleton**	*	*	11.4
Lynnfield	52.	82.	17.7
Manchester	23.	40.	7.5
Marblehead	115.	176.	30.5
Marshfield	54.	108.	38.2
Maynard	31.	61.	21.9
Medfield	39.	79.	10.8
Medway	24.	40.	14.0
Middleton	12.	19.	*
Milford	60.	92.	64.0
Millis	19.	36.	7.3
Milton	133.	137.	19.3
Nahant	17.	27.	3.5
Natick	118.	197.	163.4
Needham	149.	236.	69.4
Norfolk	11.	81.	*
North Reading	37.	77.	27.4
Norwell	30.	55.	*
Norwood	116.	160.	103.8
Pembroke	33.	65.	15.6
Randolph	91.	142.	59.5
Reading	88.	155.	46.1
Rockland	43.	69.	28.7
Rockport**	*	*	9.9
Saugus	84.	138.	127.3
Scituate	63.	108.	25.2
Sharon	53.	89.	15.7
Sherborn	16.	38.	*
Southborough	24.	40.	*
Stoneham	80.	113.	59.5
Stoughton	159.	447.	38.6
Stow**	*	*	*
Sudbury	59.	145.	19.4
Swampscott	70.	99.	26.0
Topsfield	22.	37.	*
Wakefield	96.	132.	43.9
Walpole	65.	100.	31.9
Watertown	143.	126.	70.6
Wayland	68.	102.	15.0
Wellesley	168.	140.	93.9
Wenham	18.	27.	*
Weston	26.	45.	8.5
Westwood	65.	106.	10.1
Weymouth	185.	265.	87.0
Wilmington	51.	98.	56.8
Winchester	117.	176.	24.3
Winthrop	71.	111.	17.5
Wrentham	20.	35.	*
CITIES			
Beverly	138.	175.	104.0
Boston	1,761.	2,450.	*
Cambridge	391.	509.	337.8
Chelsea	87.	121.	72.8
Everett	135.	125.	49.5
Gloucester	143.	204.	65.6
Lynn	277.	414.	191.0
Malden	182.	227.	106.5
Marlborough**	*	*	63.
Medford	215.	257.	163.
Melrose	126.	155.	40.3
Newton	492.	607.	210.0
Peabody	163.	288.	147.3
Quincy	307.	381.	237.8
Revere	140.	239.	104.7
Salem	126.	194.	113.2
Somerville	265.	246.	131.7
Waltham	205.	294.	182.7
Woburn	123.	182.	*

[1] Source: 1970 U.S. Census.
[2] Source: MAPC projections utilizing the ONSITE computer program developed by Urban Decisions System Inc.
[3] Source: Census of Retail Trade, 1972.

** Non-tracted community. * Information not available.

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* Contains useful maps.

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7
TAXES

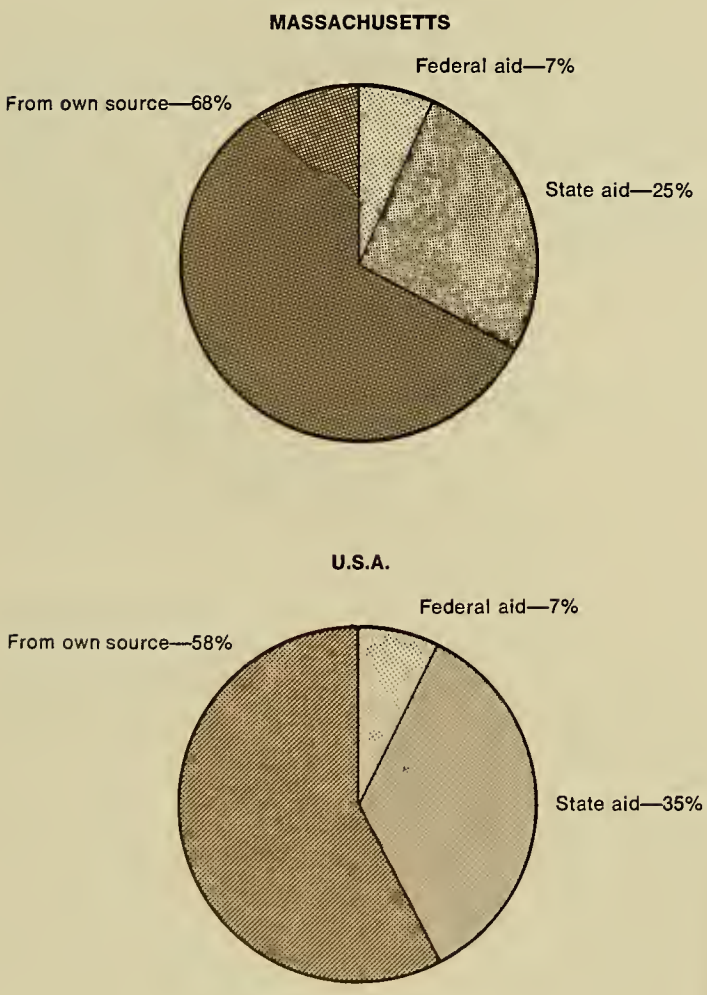
"Taxes are what we pay for a civilized society."

—Justice Oliver Wendell Holmes Jr.

Figure 7-1

Source of Revenue for Local Government

A comparison between the source of revenue for local governments in Massachusetts and the United States shows that state aid to Massachusetts communities is below the national average. This forces municipalities to obtain more revenue from their own sources.

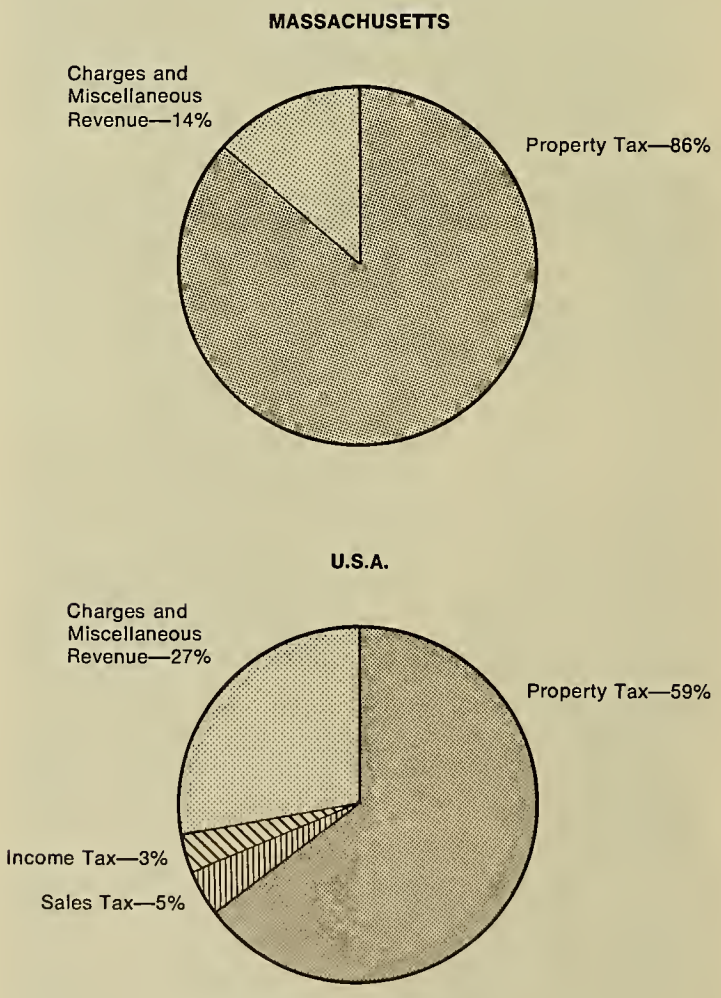


Source: U.S. Department of Commerce, Bureau of the Census, 1976.

Figure 7-2

Source of Local Revenue From Own Source

Since Massachusetts communities depend heavily on their own revenue source the breakdown of this revenue is important. The source of local revenue in Massachusetts is narrow compared to the national figures. The property tax is the only major levy available to communities and, therefore, it dominates local revenue. Charges and miscellaneous revenue (fees, toll charges and other reimbursements for current services along with interest earnings and special assessments) are under used in Massachusetts.



Source: U.S. Department of Commerce, Bureau of the Census, 1976.

Tables 7-1 and 7-2

Tax Revenue Comparison

Table 7-1, a comparison of per capita state and local tax revenues in 1975 among 11 states, shows that Massachusetts is second only to New York. Table 7-2 shows that Massachusetts led the same states in property tax revenues for 1975.

Table 7-1

Per Capita State and Local Tax Revenues in 1975

State	Tax Revenues
New York	$1,025.
Massachusetts	814.
Illinois	730.
Maryland	728.
New Jersey	725.
Wisconsin	719.
Connecticut	697.
Michigan	682.
Pennsylvania	636.
Indiana	580.
Ohio	534.

Source: Massachusetts Taxpayers Foundation, 1977.

Table 7-2

Per Capita Property Tax Revenues in 1975

State	Tax Revenues
Massachusetts	$430.
New Jersey	413.
New York	369.
Connecticut	352.
Michigan	292.
Illinois	281.
Wisconsin	271.
Indiana	231.
Maryland	213.
Ohio	202.
Pennsylvania	163.

Source: Massachusetts Taxpayers Foundation, 1977.

Table 7-3

Property Tax as a Percentage of Shelter Costs for Metropolitan Areas in 1969

Using the property tax as a percentage of total cost of shelter, the extent of the property tax burden can be determined. In these terms, Boston ranks first in the nation with 47.5 percent of the cost of shelter going toward payment of the property tax.

Location	Percentage
Urban U.S. Average	28.4%
Boston	47.5
New York—Northeastern New Jersey	44.0
Philadelphia	31.9
Hartford	30.7
Pittsburgh	27.0
Baltimore	24.2
Atlanta	9.8

Source: Federal Reserve Bank of Boston, 1975.

Note: Shelter costs include principal and interest mortgage payments, homeowner insurance premiums, repairs and maintenance, heating fuel, electricity and gas, water, sewerage, waste disposal, and depreciation for refrigerator, range, and space heater where required.

Table 7-4

Expenditure and Levy Per Capita for 1950, 1960, and 1975 In 1967 Standardized Dollars

Both the average municipal expenditure per capita and the average property tax levy (both expressed in standardized 1967 dollars) increased dramatically between 1960 and 1975 among communities in the MAPC region. In 1950, the average municipal expenditure per capita was $176.70. In 1960, this figure increased 40 percent to an average of $247.01. In 1975, the municipal expenditure average totalled $432.45, or a 75 percent increase over 1960.

In 1950, the average property tax levy per capita was $99.50, and by 1960 this figure was $160.01, an increase of 67 percent. In 1975, the average property tax levy was $275.43, or a 72 percent increase over the 1960 average figure.

	1950		1960		1975	
Community	Expenditure per capita	Levy per Capita	Expenditure per capita	Levy per Capita	Expenditure per capita	Levy per Capita
Acton	$156.55	$79.35	$241.91	$140.84	$379.15	$239.74
Arlington	158.07	103.40	232.07	156.97	393.28	296.29
Ashland	159.48	79.14	220.80	133.58	407.33	237.30
Bedford	102.43	56.50	196.79	120.75	493.47	320.86
Bellingham	118.36	59.81	140.87	80.38	330.32	162.83
Belmont	188.53	106.19	239.66	152.47	422.79	314.08
Beverly	160.45	105.02	214.36	140.46	354.60	246.95
Bolton	160.82	89.12	219.84	142.57	329.32	281.06
Boston	239.42	178.56	324.29	245.95	574.55	339.35
Boxborough	174.69	74.52	184.50	107.17	317.09	224.50
Braintree	177.78	106.76	237.48	158.86	456.59	272.95
Brookline	240.58	144.37	319.87	215.07	515.24	420.49
Burlington	124.09	71.94	190.03	130.48	539.00	371.94
Cambridge	181.02	102.22	279.05	176.24	528.23	368.06
Canton	176.62	111.22	234.55	155.26	451.80	323.69
Carlisle	139.04	71.77	239.75	163.14	470.90	320.25
Chelsea	169.94	102.71	241.18	160.72	490.81	264.56
Cohasset	260.30	147.25	326.14	214.80	431.46	303.95
Concord	200.37	111.67	313.21	215.83	488.98	361.51
Danvers	175.25	74.10	293.77	113.50	628.63	273.28
Dedham	168.03	96.40	221.96	156.25	357.87	257.61
Dover	193.42	94.98	245.23	147.61	449.72	354.03
Duxbury	227.45	152.89	308.65	209.16	532.62	367.58
Essex	156.92	71.32	250.88	173.00	351.40	229.46
Everett	207.67	132.30	273.55	186.46	440.69	334.72
Foxborough	123.50	73.27	188.59	122.55	416.59	243.71
Framingham	169.76	99.93	229.72	158.10	432.54	274.29
Franklin	141.37	67.11	168.27	102.36	366.00	190.71
Gloucester	209.22	124.85	244.07	168.64	467.16	285.19
Hamilton	192.84	126.40	214.34	137.20	334.39	220.70
Hanover	182.23	93.35	253.31	152.30	480.17	242.91
Hingham	223.17	122.53	289.20	208.93	445.68	304.29
Holbrook	134.98	62.78	174.99	104.28	358.63	195.14
Holliston	129.11	67.07	208.43	128.62	407.07	243.47
Hopkinton	178.56	79.11	224.16	133.96	387.90	218.99
Hudson	135.47	72.69	188.89	108.11	364.23	200.37
Hull	551.83	40.89	418.20	305.56	484.74	264.18
Ipswich	159.89	81.09	239.73	157.24	399.56	236.54
Lexington	184.95	112.81	288.75	206.73	487.53	331.21
Lincoln	183.60	108.81	251.06	165.97	452.66	295.26
Littleton	192.65	66.16	257.42	148.90	369.25	180.84

Source: Massachusetts Department of Corporations and Taxation.
Note: All figures are in 1967 Standardized Dollars.

Community	1950 Expenditure per capita	1950 Levy per Capita	1960 Expenditure per capita	1960 Levy per Capita	1975 Expenditure per capita	1975 Levy per Capita
Lynn	186.53	108.30	237.18	148.84	438.41	295.85
Lynnfield	156.88	104.01	266.80	176.23	374.24	261.40
Malden	155.17	92.40	241.73	160.65	336.69	233.40
Manchester	290.16	187.44	381.08	238.65	469.94	340.55
Marblehead	196.30	116.96	266.87	166.40	440.12	290.85
Marlborough	127.53	71.11	166.60	108.19	378.36	212.66
Marshfield	330.60	185.08	392.85	273.90	465.49	278.30
Maynard	132.91	71.58	195.69	112.87	364.08	232.06
Medfield	105.48	66.35	190.75	128.01	408.51	235.39
Medford	166.43	102.78	204.95	135.37	367.34	246.83
Medway	139.76	72.85	191.10	115.13	466.84	248.96
Melrose	168.85	96.95	217.71	145.84	378.79	295.39
Middleton	149.28	51.30	263.96	142.09	621.27	227.35
Milford	114.99	68.96	176.20	113.15	314.21	192.43
Millis	148.72	73.35	258.40	147.97	375.60	246.09
Milton	172.62	103.83	246.53	158.36	371.14	275.41
Nahant	249.84	142.40	225.60	150.12	345.55	248.77
Natick	143.90	78.22	262.52	173.31	429.75	309.16
Needham	217.17	126.25	326.80	199.71	513.86	338.00
Newton	200.49	130.73	306.14	209.79	508.08	384.27
Norfolk	86.37	37.90	150.88	88.69	289.11	168.05
N. Reading	130.86	78.09	227.55	147.47	387.75	215.81
Norwell	157.19	86.76	278.14	171.86	570.06	309.97
Norwood	231.14	98.22	304.39	149.90	531.38	232.19
Peabody	159.27	86.75	214.00	127.38	391.65	264.45
Pembroke	200.88	103.94	239.26	152.33	352.28	172.79
Quincy	190.16	116.33	292.42	177.79	509.85	275.15
Randolph	131.81	75.02	194.52	136.12	377.96	220.33
Reading	187.06	108.37	235.17	149.43	396.22	242.49
Revere	170.09	120.19	230.88	171.44	440.76	271.33
Rockland	147.58	80.14	199.24	125.46	348.47	169.15
Salem	172.45	112.09	233.82	165.22	480.24	302.70
Saugus	123.47	71.92	207.87	137.22	375.34	257.68
Scituate	255.50	167.86	322.16	242.42	476.95	288.95
Sharon	177.57	111.19	249.89	168.53	437.40	299.19
Sherborn	197.93	97.97	324.97	210.30	507.91	389.86
Somerville	152.37	99.86	213.80	150.09	335.18	210.67
Southborough	159.47	77.84	226.38	138.60	458.93	272.15
Stoneham	159.51	100.84	213.61	148.56	377.74	256.76
Stoughton	157.78	78.71	218.69	141.95	352.77	213.43
Stow	154.65	66.10	207.34	134.21	286.65	239.70
Sudbury	181.57	103.41	290.06	217.74	473.97	336.09
Swampscott	209.57	133.44	288.31	203.22	420.91	307.58
Topsfield	200.32	103.97	274.77	192.47	407.43	240.80
Wakefield	157.09	88.07	248.82	143.58	407.19	258.69
Walpole	196.29	111.47	263.59	162.42	471.22	285.89
Waltham	156.62	92.07	228.32	139.23	414.40	287.36
Watertown	164.37	103.94	228.43	158.40	414.68	305.75
Wayland	211.51	116.71	284.67	202.76	520.56	366.70
Wellesley	239.61	137.40	415.27	194.60	654.85	371.71
Wenham	194.81	116.40	240.19	157.88	380.42	285.78
Weston	221.60	131.84	368.60	235.30	626.05	476.20
Westwood	151.22	102.76	273.21	189.88	517.54	394.32
Weymouth	173.45	99.61	278.83	171.21	396.11	246.75
Wilmington	143.00	90.91	212.71	152.34	551.68	276.69
Winchester	215.54	131.24	306.86	202.45	478.22	352.48
Winthrop	135.78	78.50	184.54	118.49	292.26	178.89
Woburn	135.88	76.03	185.06	125.67	425.41	264.08
Wrentham	114.36	65.19	170.15	100.23	337.46	177.17

Table 7-5

Equalized Tax Rates for the MAPC Region for 1959, 1970 & 1975

Equalized tax rates are used to facilitate comparison among municipal tax rates because most communities do not assess properties at full market value. Equalized tax rates, a result of the biennial equalization by the Massachusetts Department of Corporations and Taxation, represent a full value tax rate based on assessment at full, market value. In the past, there have been definite weaknesses in the equalization process, particularly in the underestimation of the full property value. The problems in the equalization process have been rectified in recent years, but past estimates must be used carefully.

Community	1959	1970	1975
Acton	$27.90	$43.00	$31.40
Arlington	33.90	47.40	47.00
Ashland	28.70	47.70	33.80
Bedford	27.10	41.60	36.70
Bellingham	22.40	45.70	35.20
Belmont	21.30	36.80	37.10
Beverly	31.10	46.30	37.50
Bolton	24.00	36.20	34.80
Boston	66.40	101.40	135.70
Boxborough	18.60	33.40	30.40
Braintree	28.70	42.20	33.10
Brookline	34.70	58.30	51.20
Burlington	26.40	43.10	41.80
Cambridge	36.30	69.20	72.10
Canton	27.80	32.00	38.30
Carlisle	27.40	43.10	30.20
Chelsea	54.30	106.30	88.20
Cohasset	29.10	49.00	33.90
Concord	31.70	39.20	37.30
Danvers	28.00	39.40	35.40
Dedham	25.10	32.00	31.50
Dover	15.00	32.20	28.20
Duxbury	20.20	39.00	41.20
Essex	30.30	37.20	27.60
Everett	29.90	38.80	40.60
Foxborough	32.90	42.90	37.10
Framingham	29.50	43.00	36.50
Franklin	29.80	39.30	40.00
Gloucester	36.00	54.10	19.10
Hamilton	21.60	31.00	28.10
Hanover	28.70	49.80	33.00
Hingham	39.40	52.40	40.30
Holbrook	29.80	42.00	36.80
Holliston	30.40	35.20	37.20
Hopkinton	33.10	32.90	31.30
Hudson	31.10	47.70	42.30
Hull	35.30	75.20	49.30
Ipswich	26.60	34.30	34.40
Lexington	35.20	54.20	38.70
Lincoln	29.60	46.80	27.80
Littleton	30.10	42.80	25.20
Lynn	39.50	58.40	67.90
Lynnfield	22.30	38.60	33.30
Malden	37.00	65.10	44.90
Manchester	27.10	35.00	29.40
Marblehead	23.80	35.00	27.20
Marlborough	28.30	58.50	37.10
Marshfield	27.20	59.00	41.20
Maynard	27.60	44.50	37.80
Medfield	28.10	41.90	35.10
Medford	30.50	57.60	49.20
Medway	33.50	43.80	38.40
Melrose	28.40	46.30	32.00
Middleton	34.40	47.60	14.10
Milford	26.20	43.00	47.60
Millis	34.20	41.90	39.70
Milton	24.30	34.30	37.30
Nahant	27.80	47.10	35.70
Natick	26.50	47.50	41.60
Needham	24.70	36.90	34.00
Newton	28.80	58.20	49.60
Norfolk	31.80	37.50	34.00
N. Reading	30.00	49.90	35.10
Norwell	30.40	42.70	38.30
Norwood	26.30	45.60	36.00
Peabody	26.20	39.60	38.60
Pembroke	27.70	46.10	30.10
Quincy	33.80	53.30	49.60
Randolph	31.30	58.00	39.00
Reading	31.10	44.00	35.00
Revere	47.70	61.10	52.70
Rockland	29.40	59.60	37.50
Rockport	24.20	25.30	20.20
Salem	31.10	58.20	44.00
Saugus	30.40	40.10	35.40
Scituate	29.90	53.00	39.60
Sharon	31.80	45.10	42.00
Sherborn	26.10	44.20	33.30
Somerville	49.80	75.30	58.90
Southborough	31.40	47.60	31.70
Stoneham	28.00	48.10	38.90
Stoughton	34.30	56.90	38.10
Stow	19.60	42.80	35.70
Sudbury	35.00	37.00	37.60
Swampscott	27.90	48.80	38.30
Topsfield	27.60	43.10	29.80
Wakefield	28.50	44.50	40.20
Walpole	28.80	41.60	41.30
Waltham	27.80	44.40	38.30
Watertown	33.60	53.70	50.50
Wayland	30.80	45.30	39.10
Wellesley	23.10	38.60	35.30
Wenham	20.40	28.20	28.10
Weston	24.60	44.80	34.60
Westwood	24.70	40.70	39.50
Weymouth	31.60	43.00	41.20
Wilmington	38.10	42.00	34.50
Winchester	28.50	49.50	43.40
Winthrop	33.00	48.20	36.70
Woburn	29.70	56.00	37.00
Wrentham	37.70	49.10	33.20

Source: Massachusetts Taxpayers Foundation, 1977.

Table 7-6

Municipal Finance in the MAPC Region

The breakdown of municipal budgets by school and non-school costs can show the basic characteristics of a community. The urban communities are forced to spend a greater part of their budget on general expenditures compared to the suburban and rural localities that spend a larger portion on education.

	Fiscal Year 1971		Fiscal Year 1975	
Community	General Government	School	General Government	School
Acton	28%	72%	27%	73%
Arlington	53	47	62	38
Ashland	48	52	NA	NA
Bedford	47	53	41	59
Bellingham	50	50	43	57
Belmont	53	47	46	54
Beverly	50	50	36	64
Bolton	18	82	22	78
Boston	20	80	25	75
Boxborough	23	77	32	68
Braintree	43	57	45	55
Brookline	67	33	65	35
Burlington	50	50	52	48
Cambridge	60	40	32	68
Canton	50	50	49	51
Carlisle	28	72	40	60
Chelsea	83	17	90	10
Cohasset	45	55	42	58
Concord	35	65	34	66
Danvers	45	55	39	61
Dedham	46	54	58	42
Dover	42	58	42	58
Duxbury	55	45	56	44
Essex	44	56	53	47
Everett	55	45	56	44
Foxborough	48	52	50	50
Framingham	69	31	75	25
Franklin	44	56	38	62
Gloucester	56	44	54	46
Hamilton	30	70	44	66
Hanover	37	63	37	63
Hingham	72	28	67	33
Holbrook	39	61	38	62
Holliston	34	66	33	67
Hopkinton	55	45	62	38
Hudson	54	46	47	53
Hull	55	45	52	48
Ipswich	54	46	56	44
Lexington	38	62	41	59
Lincoln	40	60	44	56
Littleton	37	63	24	76
Lynn	NA	NA	NA	NA
Lynnfield	35	65	38	64
Malden	61	39	58	42
Manchester	53	47	47	53
Marblehead	57	43	NA	NA
Marlborough	61	39	52	48
Marshfield	48	52	48	52
Maynard	50	50	53	47
Medfield	40	60	45	55
Medford	58	42	50	50
Medway	46	54	43	57
Melrose	49	51	45	55
Middleton	54	46	57	43
Milford	62	38	42	58
Millis	44	56	48	52
Milton	58	42	NA	NA
Nahant	NA	NA	NA	NA
Natick	51	49	46	54
Needham	59	41	55	45
Newton	NA	NA	NA	NA
Norfolk	41	59	41	59
N. Reading	42	58	38	62
Norwell	51	49	44	56
Peabody	54	46	52	48
Pembroke	42	58	30	70
Quincy	62	38	62	38
Randolph	NA	NA	NA	NA
Reading	17	83	48	52
Revere	NA	NA	NA	NA
Rockland	51	49	56	44
Rockport	56	44	54	46
Salem	60	40	59	41
Saugus	47	53	48	52
Scituate	56	44	55	45
Sharon	NA	NA	41	59
Sherborn	31	69	27	73
Somerville	65	35	59	41
Southborough	44	56	38	62
Stoneham	54	46	NA	NA
Stoughton	36	64	46	54
Stow	30	70	31	69
Sudbury	36	64	33	67
Swampscott	52	48	47	53
Topsfield	32	68	27	73
Wakefield	47	53	47	53
Walpole	43	57	43	57
Waltham	50	50	50	50
Watertown	59	41	59	41
Wayland	37	63	40	60
Wellesley	45	55	45	55
Wenham	41	59	41	59
Weston	35	65	34	66
Westwood	37	63	43	57
Weymouth	52	48	51	49
Wilmington	35	65	29	71
Winchester	43	57	43	57
Winthrop	47	53	42	58
Woburn	38	62	53	47
Wrentham	48	52	42	58

Source: Massachusetts Selectmen's Association, 1976.

Table 7-7

Per Pupil School Cost in the MAPC Region

There are many variables that effect per pupil cost figures, for example, differing local teachers' pay scales. Comparison among communities is useful for examining trends among community types.

Community	1970-71	1973-74
Acton	$ 687.54	$1,068.00
Arlington	945.63	1,366.00
Ashland	838.25	1,099.00
Bedford	1,001.25	1,125.81
Bellingham	662.63	825.72
Belmont	898.13	1,266.00
Beverly	727.76	940.00
Bolton	911.32	1,190.00
Boston	935.24	NA
Boxborough	770.92	1,001.00
Braintree	845.61	1,206.81
Brookline	1,470.93	2,235.14
Burlington	896.00	1,093.00
Cambridge	1,327.84	1,873.00
Canton	912.18	1,284.22
Carlisle	1,032.18	1,054.00
Chelsea	798.78	1,223.00
Cohasset	1,080.00	1,374.00
Concord	945.46	1,496.74
Danvers	888.67	1,110.00
Dedham	720.79	862.69
Dover	1,126.40	1,355.00
Duxbury	872.29	1,189.23
Essex	806.88	891.00
Everett	957.54	1,291.00
Foxborough	803.78	1,029.81
Framingham	864.26	1,258.16
Franklin	813.16	948.12
Gloucester	829.37	1,020.50
Hamilton	693.30	1,101.00
Hanover	841.53	1,249.00
Hingham	935.60	1,187.19
Holbrook	782.12	1,260.00
Holliston	950.91	1,156.34
Hopkinton	745.33	1,007.00
Hudson	740.43	900.28
Hull	910.07	1,211.38
Ipswich	829.88	1,089.00
Lexington	1,092.82	1,440.00
Lincoln	1,290.00	1,386.00
Littleton	1,065.55	1,316.35
Lynn	751.97	1,079.00
Lynnfield	987.71	1,072.00
Malden	735.34	1,021.00
Manchester	945.82	1,091.00
Marblehead	943.47	1,218.00
Marlborough	608.74	852.00
Marshfield	858.59	988.00
Maynard	767.08	938.26
Medfield	817.88	1,136.00
Medford	800.36	1,010.00
Medway	778.25	975.67
Melrose	868.58	1,167.57
Middleton	656.75	1,032.00
Milford	778.92	1,057.00
Millis	743.48	1,057.00
Milton	1,014.07	1,120.00
Nahant	855.87	1,091.00
Natick	873.59	1,090.00
Needham	1,011.74	1,276.00
Newton	1,223.44	1,593.00
Norfolk	567.91	691.00
N. Reading	840.69	1,022.00
Norwell	933.64	1,228.00
Norwood	849.03	1,101.00
Peabody	812.68	1,077.00
Pembroke	683.14	811.00
Quincy	915.57	1,347.00
Randolph	838.11	1,125.00
Reading	813.76	952.50
Revere	834.98	1,194.00
Rockland	751.05	1,193.00
Rockport	805.97	1,269.00
Salem	890.38	1,159.00
Saugus	782.41	945.00
Scituate	795.83	1,167.07
Sharon	1,005.00	1,234.00
Sherborn	1,008.92	1,258.00
Somerville	756.46	918.00
Southborough	743.70	969.00
Stoneham	887.81	1,144.36
Stoughton	711.40	1,045.95
Stow	938.36	1,145.00
Sudbury	881.81	1,090.02
Swampscott	1,109.13	1,299.00
Topsfield	669.09	843.00
Wakefield	834.12	1,125.00
Walpole	958.52	1,160.00
Waltham	801.95	1,208.00
Watertown	1,008.85	1,224.00
Wayland	1,123.09	1,665.00
Wellesley	1,263.46	1,459.00
Wenham	688.76	1,111.00
Weston	1,409.74	1,841.00
Westwood	1,018.78	1,268.00
Weymouth	692.10	969.00
Wilmington	787.22	1,199.71
Winchester	1,068.68	1,338.00
Winthrop	720.84	1,008.00
Woburn	823.14	991.00
Wrentham	814.82	922.00

Source: Massachusetts Selectmen's Association, 1976.

Table 7-8

Per Capita State Aid to Communities in the MAPC Region in 1966 and 1976 (in 1967 standardized dollars)

State aid to communities in the MAPC region increased moderately during the 10-year period 1966 to 1976. In 1966 the average state aid figure per capita (in 1967 standardized dollars) was $61.82. In 1976 the average amount was $71.80 per capita, a 16 percent increase.

Community	1966	1976
Acton	57.25	63.57
Arlington	42.95	49.87
Ashland	61.88	70.79
Bedford	61.30	97.50
Bellingham	64.34	114.02
Belmont	48.75	46.30
Beverly	58.31	49.19
Bolton	57.85	65.14
Boston	97.53	122.16
Boxborough	68.82	42.27
Braintree	60.01	65.48
Brookline	60.82	40.66
Burlington	55.66	84.48
Cambridge	53.50	26.37
Canton	60.00	61.09
Carlisle	68.71	88.00
Chelsea	74.96	89.76
Cohasset	64.89	65.47
Concord	53.62	60.40
Danvers	50.39	61.76
Dedham	49.40	40.07
Dover	57.37	49.60
Duxbury	78.52	115.32
Essex	60.95	59.46
Everett	70.51	57.73
Foxborough	62.47	88.01
Framingham	60.72	65.45
Franklin	73.53	115.23
Gloucester	78.96	70.36
Hamilton	64.04	50.12
Hanover	75.18	103.60
Hingham	62.46	84.12
Holbrook	53.07	88.52
Holliston	74.88	100.19
Hopkinton	80.35	74.83
Hudson	61.45	88.73
Hull	87.91	111.66
Ipswich	68.70	70.92
Lexington	54.74	66.52
Lincoln	47.56	74.30
Littleton	54.29	84.67
Lynn	70.85	76.41
Lynnfield	62.70	63.21
Malden	61.11	48.55
Manchester	73.86	44.15
Marblehead	46.60	32.81
Marlborough	61.80	80.85
Marshfield	97.38	93.12
Maynard	54.86	59.71
Medfield	63.08	103.81
Medford	49.28	56.52
Medway	92.26	110.31
Middleton	56.34	91.00
Milford	43.78	96.75
Millis	72.04	81.40
Milton	43.93	36.68
Nahant	45.82	35.81
Natick	59.87	56.15
Needham	50.15	48.44
Newton	47.74	46.46
Norfolk	50.84	75.51
N. Reading	65.52	88.32
Norwell	65.01	116.74
Norwood	55.60	71.07
Peabody	62.34	90.19
Pembroke	99.54	89.29
Quincy	52.22	48.84
Randolph	59.81	86.10
Reading	50.74	63.20
Revere	57.47	84.70
Rockland	60.28	111.50
Rockport	50.71	33.96
Salem	59.67	69.30
Saugus	54.92	58.10
Scituate	74.07	90.12
Sharon	72.01	77.46
Sherborn	68.44	55.73
Somerville	55.89	63.23
Southborough	57.72	62.09
Stoneham	42.91	54.60
Stoughton	70.10	80.72
Stow	61.95	78.97
Sudbury	71.97	86.60
Swampscott	49.66	42.50
Topsfield	65.44	72.62
Wakefield	50.96	77.81
Walpole	69.64	82.65
Waltham	52.00	46.62
Watertown	47.30	40.03
Wayland	56.17	87.91
Wellesley	50.63	44.86
Wenham	55.09	40.53
Weston	74.60	89.20
Westwood	57.11	67.11
Weymouth	54.75	77.28
Wilmington	65.48	89.66
Winchester	45.34	55.08
Winthrop	48.28	68.85
Woburn	56.69	71.37
Wrentham	39.25	74.20

Source: Massachusetts Department of Corporations and Taxation, 1977.

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* Contains useful maps.

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8
TRANSPORTATION

"Our national flower is the concrete cloverleaf."

—Lewis Mumford

Table 8-1 and Figures 8-1 and 8-2

Travel Characteristics in the MAPC Region

Basic to the understanding of transportation needs within the region is the knowledge of the travel characteristics routinely displayed by the population. The following figures show two examples of forecasted travel patterns common to the region. Zone 38 in the western suburbs can be said to be typical of most of the region's other suburban areas, while Zone 13, Chelsea, is a fair representative of travel characteristics in urban areas.

Zone 13

Chelsea

Zone 13 consists of the City of Chelsea. The CTPS estimate of the 1980 population is 26,000. Chelsea is characterized as an employment center as well as a community with an older urban commercial center. Chelsea is also a residential community of very high density. According to CTPS estimates, Chelsea is experiencing a decline in population. This is also the case for some cities and towns adjacent to Chelsea. Income levels for Chelsea residents are below the average for the metropolitan area.

Chelsea is served by MBTA bus service. The city is near several Blue Line stations. The city is served by Route 1.

Forecasts for travel from zone 13 for 1980 show over 9,000 trips made during the A.M. peak period. Of these trips 20 percent are internal to the zone. Over 33 percent are destined to be to the core, 29 are circumferential, and 13 are outward. About 4 percent of the A.M. peak period trips are through the core.

Of the morning trips to the core in 1980, about 68 percent are destined to be by transit. Trips with destination to the Boston CBD, represent about 55 percent of all trips to the core. About 72 percent of the trips to the Boston CBD are by transit.

Zone 38

Ashland, Framingham, Natick and Sherborn

Zone 38 consists of the towns of Ashland, Framingham, Natick, and Sherborn. The CTPS estimate of 1980 population for the towns in zone 38 is 118,000. Framingham is a populous residential center with retail opportunities and is also an employment center. Sherborn is a high income residential community that is rural in character. The other two towns in zone 38 have similar income and auto-ownership characteristics. Framingham and Natick have higher population densities than Sherborn and Ashland have.

All four towns in zone 38 are growing according to CTPS estimates. Sherborn is growing at a much faster rate than any of the other three towns.

Framingham and Natick are served by the Boston and Albany Main Line of CONRAIL, by private bus carriers, by Route 9, and by Interstate 90. Sherborn and Natick are served by Route 16 and by Interstate 90. Route 135 also serves the towns in the zone.

Forecasts for travel from zone 38 for 1980 show about 55,000 trips made during the A.M. peak period. More than 63 percent of these trips will be internal to the zone. About 11 percent are to the core, and 13 percent are inward with destination outside the core. About 7 percent of these trips are circumferential, and 6 percent are outward.

Of the morning trips to the core in 1980, about 46 percent are estimated to be by transit. Trips with Boston CBD destinations represent 58 percent of all trips to the core. About 50 percent of the trips destined to the Boston CBD are by transit.

Table 8-1

Community Characteristics

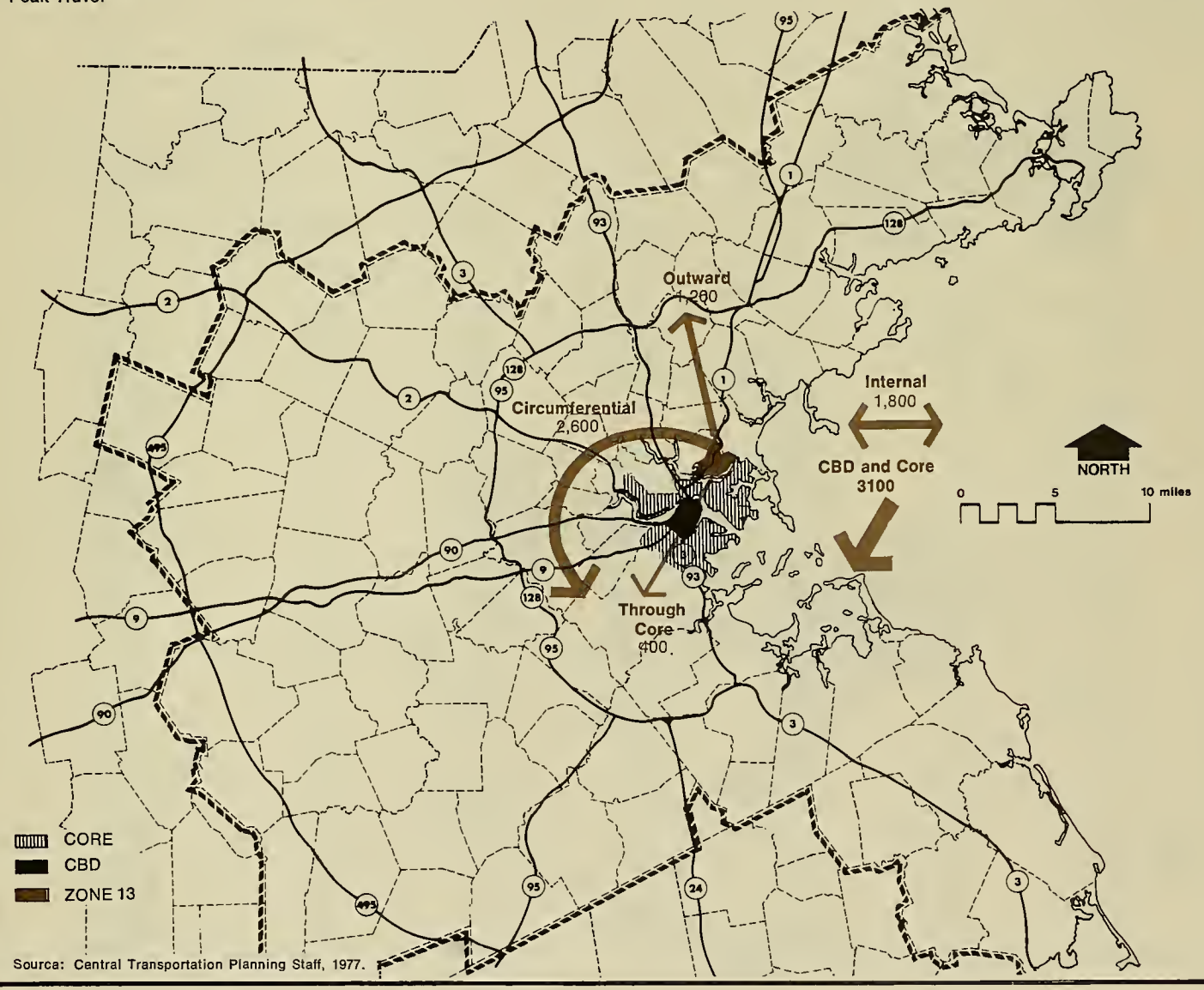
	1970 Population	1980 Estimated Population	Percent Change	1970 Population Density (Persons Per Square Mile)	1970 Percent Elderly	1970 Median Income	1970 Automobiles Per Household (Percent of Households) None	One	Two or More
ZONE 13									
Chelsea	30,625	26,000	—17.7	14,113	13.6	$ 8,973	44.8	45.4	9.8
ZONE 38									
Ashland	8,882	10,500	+18.2	685	6.2	$12,148	10.3	46.1	43.6
Framingham	54,048	68,000	+6.1	2,349	8.5	$13,090	10.2	46.3	43.5
Natick	31,057	34,000	+9.4	1,942	8.1	$13,144	8.7	48.5	43.8
Sherborn	3,309	5,500	+66.2	215	6.2	$17,833	1.6	24.6	73.8
ZONE 38 Total	97,296	118,000	+21.3	1,340	8.1	$13,136	9.4	46.1	44.5

Source: Central Transportation Planning Staff, 1976.

Figure 8-1

Characteristics of Regional Travel, Zone 13

Direction/ Destination of Travel	To CBD	To Remainder of Core	Inward (not to Core)	Through Core	Circumferential	Outward	Internal	Total
Number of Trips	1,700	1,400	0	400	2,600	1,200	1,800	9,100
Percent of Total Peak Travel	18.7	15.4	0	4.4	28.5	13.2	19.8	100.0

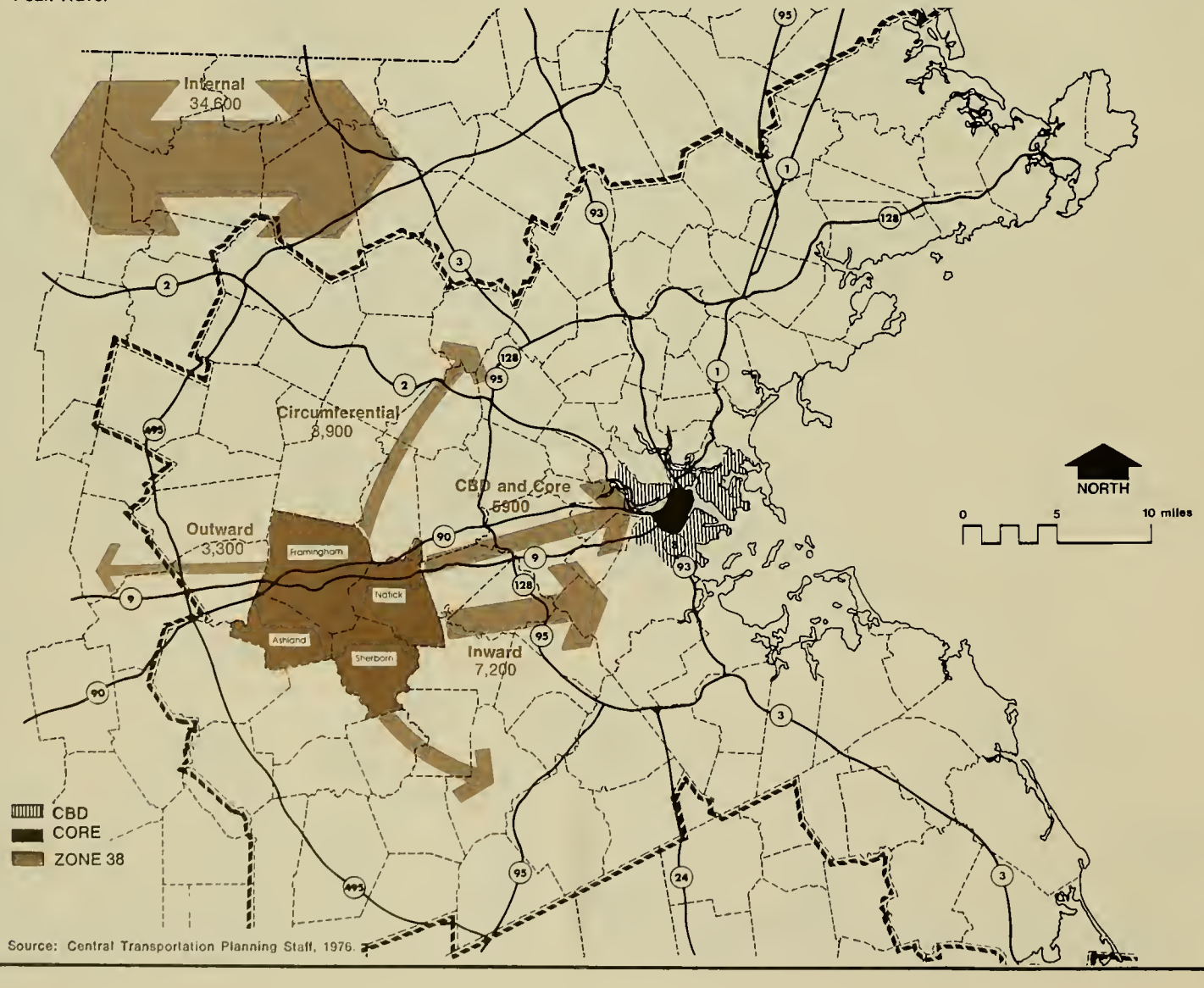


Source: Central Transportation Planning Staff, 1977.

Figure 8-2

Characteristics of Regional Travel, Zone 38

Direction/ Destination of Travel	To CBD	To Remainder of Core	Inward (not to Core)	Through Core	Circumferential	Outward	Internal	Total
Number of Trips	3,400	2,500	7,200	0	3,900	3,300	34,600	54,900
Percent of Total Peak Travel	6.2	4.5	13.1	0	7.1	6.0	63.1	100.0



Source: Central Transportation Planning Staff, 1976.

Tables 8-2 and 8-3

Cost of Automobile Operation

The cost of operating a private automobile in the region has increased dramatically in the last generation. One good indication of that increase is the cost of insurance paid by car owners. Table 8-2 shows the insurance rate increase from 1950 to 1976 for communities in the MAPC region. The rates are based on the following assumptions:

1. The rates are for 5/10 category bodily injury liability and $5,000 property damage liability as shown in the respective columns.
2. An addition of $3.00 was added to 1950 totals for "guest and extra territorial bodily injury liability coverage." In 1976, this figure is $6.00.
3. The rates are for "class 10 driver," i.e., male driver over 25 years old.

Table 8-3 underscores the insurance rate data by showing that the Boston area pays some of the highest per mile operating costs in the nation, especially for taxes, fees and insurance.

Table 8-2

Comparative Insurance Rates for the MAPC Region

Community	1950 Liability[2] 5/10 +$3	1950 Property Damage	1950 Total	1976 Liability[2] 5/10 +$6	1976 Property Damage	1976 Total
Acton	$16.20	$14.00	$30.20	$24.00	$35.00	$65.00
Arlington	29.10	19.50	51.60	28.00	36.00	70.00
Ashland	27.10	18.00	48.10	30.00	42.00	78.00
Bedford	24.20	17.00	44.20	24.00	35.00	65.00
Bellingham	18.00	17.00	39.00	28.00	36.00	70.00
Belmont	24.20	17.00	44.20	24.00	35.00	65.00
Beverly	20.60	17.00	40.60	24.00	35.00	65.00
Bolton	16.20	14.00	34.20	30.00	42.00	78.00
Boston	50.10	29.00	82.10	46.00	58.00	110.00
Boxborough	16.20	14.00	34.20	24.00	35.00	65.00
Braintree	27.10	18.00	48.10	30.00	42.00	78.00
Brookline	34.80	29.00	66.80	30.00	42.00	78.00
Burlington	43.80	23.00	69.80	30.00	42.00	78.00
Cambridge	40.40	27.00	70.40	30.00	42.00	78.00
Canton	31.70	20.00	54.70	30.00	42.00	78.00
Carlisle	24.20	17.00	44.20	24.00	35.00	65.00
Chelsea	53.70	27.00	83.70	39.00	48.00	93.00
Cohasset	27.10	18.00	48.10	28.00	36.00	70.00
Concord	18.00	17.00	38.00	24.00	35.00	65.00
Danvers	24.20	17.00	44.20	28.00	36.00	70.00
Dover	18.00	17.00	38.00	24.00	36.00	65.00
Duxbury	20.60	17.00	40.60	24.00	36.00	65.00
Essex	16.20	14.00	33.20	28.00	36.00	70.00
Everett	43.80	23.00	69.80	36.00	46.00	88.00
Foxborough	24.20	17.00	44.20	30.00	42.00	78.00
Framingham	29.10	19.50	51.60	24.00	35.00	65.00
Franklin	20.60	17.00	40.60	30.00	42.00	78.00
Gloucester	20.60	17.00	40.60	30.00	42.00	78.00
Hamilton	18.00	17.00	38.00	24.00	35.00	65.00
Hanover	20.60	17.00	40.60	28.00	36.00	70.00
Hingham	27.10	18.00	48.10	24.00	35.00	65.00
Holbrook	29.10	19.50	51.60	30.00	42.00	78.00
Holliston	27.10	18.00	48.10	28.00	36.00	70.00
Hopkinton	20.60	17.00	40.60	24.00	35.00	65.00
Hudson	27.10	18.00	48.10	28.00	36.00	70.00

Source: Massachusetts Division of Insurance, 1977.

Community	1950 Liability[2] 5/10 +$3	1950 Property Damage	1950 Total	1976 Liability[2] 5/10 +$6	1976 Property Damage	1976 Total
Hull	40.40	23.00	66.40	39.00	48.00	93.00
Ipswich	24.20	17.00	44.20	28.00	36.00	70.00
Lexington	27.10	18.00	48.10	24.00	35.00	65.00
Lincoln	24.20	17.00	44.20	24.00	35.00	65.00
Littleton	20.60	17.00	40.60	24.00	35.00	65.00
Lynn	34.80	23.00	60.80	36.00	46.00	88.00
Lynnfield	29.10	19.50	51.60	24.00	35.00	65.00
Malden	40.40	23.00	66.40	39.00	48.00	93.00
Manchester	16.20	14.00	34.20	24.00	35.00	65.00
Marblehead	18.00	17.00	38.00	24.00	35.00	65.00
Marlborough	31.70	20.00	54.70	28.00	36.00	70.00
Marshfield	20.60	17.00	40.60	30.00	42.00	78.00
Maynard	20.60	17.00	40.60	24.00	35.00	65.00
Medfield	27.10	18.00	48.10	24.00	35.00	65.00
Medford	39.00	23.00	65.00	36.00	46.00	88.00
Medway	24.20	17.00	44.20	30.00	42.00	78.00
Melrose	27.10	19.50	49.60	30.00	42.00	78.00
Middleton	29.10	19.50	51.60	30.00	42.00	78.00
Milford	27.10	18.00	48.10	30.00	42.00	78.00
Millis	29.10	19.50	51.60	28.00	36.00	70.00
Milton	24.20	17.00	44.20	30.00	42.00	78.00
Nahant	27.10	18.00	48.10	30.00	42.00	78.00
Natick	29.10	19.50	51.60	30.00	42.00	78.00
Needham	24.20	17.00	44.20	24.00	35.00	65.00
Newton	27.10	19.50	49.60	30.00	42.00	78.00
Norfolk	24.20	17.00	44.20	30.00	42.00	78.00
N. Reading	34.80	23.00	60.80	30.00	42.00	78.00
Norwell	20.60	17.00	40.60	24.00	35.00	65.00
Norwood	31.70	20.00	54.70	30.00	42.00	78.00
Peabody	31.70	20.00	54.70	30.00	42.00	78.00
Pembroke	20.60	17.00	40.60	30.00	42.00	78.00
Quincy	29.80	21.00	53.80	30.00	42.00	78.00
Randolph	34.80	23.00	60.80	36.00	46.00	88.00
Reading	27.10	18.00	48.10	30.00	42.00	78.00
Revere	56.30	27.00	86.30	39.00	48.00	93.00
Rockland	24.20	17.00	44.20	30.00	42.00	78.00
Rockport	16.20	14.00	33.20	24.00	35.00	65.00
Salem	31.70	20.00	54.70	30.00	42.00	78.00
Saugus	34.80	23.00	60.80	36.00	46.00	88.00
Scituate	20.60	17.00	40.60	30.00	42.00	78.00
Sharon	31.70	20.00	54.70	30.00	42.00	78.00
Sherborn	16.20	14.00	33.20	24.00	35.00	65.00
Somerville	43.80	23.00	69.80	39.00	48.00	93.00
Southborough	24.20	17.00	44.20	28.00	36.00	70.00
Stoneham	31.70	20.00	54.70	28.00	36.00	70.00
Stoughton	31.70	20.00	54.70	30.00	42.00	78.00
Stow	16.20	14.00	33.20	24.00	35.00	65.00
Sudbury	24.20	17.00	44.20	24.00	35.00	65.00
Swampscott	27.10	18.00	48.10	30.00	42.00	78.00
Topsfield	16.20	14.00	33.20	24.00	35.00	65.00
Wakefield	29.10	19.50	51.60	28.00	36.00	70.00
Walpole	27.10	18.00	48.10	28.00	36.00	70.00
Waltham	31.70	20.00	54.70	30.00	42.00	78.00
Watertown	31.70	20.00	54.70	30.00	42.00	78.00
Wayland	24.20	17.00	44.20	24.00	35.00	65.00
Wellesley	20.60	17.00	40.60	24.00	35.00	65.00
Wenham	16.20	14.00	33.20	28.00	36.00	70.00
Weston	20.60	17.00	40.60	24.00	35.00	65.00

Community	1950 Liability[2] 5/10 +$3	1950 Property Damage	1950 Total	1976 Liability[2] 5/10 +$6	1976 Property Damage	1976 Total
Westwood	24.20	17.00	44.20	30.00	42.00	78.00
Weymouth	27.10	18.00	48.10	30.00	42.00	78.00
Wilmington	43.80	23.00	69.80	30.00	42.00	78.00
Winchester	27.10	18.00	48.10	24.00	35.00	65.00
Winthrop	40.40	23.00	66.40	36.00	46.00	88.00
Woburn	43.80	23.00	69.80	30.00	42.00	78.00
Wrentham	18.00	17.00	38.00	30.00	42.00	78.00

Table 8-3

Cost of Car Operation in 1977

Full-Size Car:	Price	Taxes, Fees	Depreciation	Insurance	Gas, Cost/Gal.	Maintenance	Cost Per Mile
Boston, MA	$5886.01	$362.45	$ 980.80	$1573.00	64.2c	$294.69	23.63c
Springfield, MA	5886.01	362.45	980.60	688.00	64.9	262.44	17.81
Worcester, MA	5886.01	362.45	980.60	870.00	62.9	262.44	18.97
Rural Massachusetts	5886.01	362.45	980.60	459.00	60.9	262.01	16.28
Hartford, CT	5871.01	357.73	978.11	631.00	68.9	290.99	17.94
Rural Connecticut	5871.01	252.69	978.11	435.00	66.9	286.69	15.92
Providence, RI	5885.01	329.43	980.44	825.00	69.9	300.35	19.10
Rural Rhode Island	5885.01	271.29	980.44	572.00	67.9	275.90	16.89
Portland, ME	5896.01	233.32	982.27	395.00	65.9	270.25	15.42
Rural Maine	5896.01	233.32	982.27	322.00	66.9	247.89	14.87
Manchester, NH	5883.01	116.72	980.10	374.00	66.9	287.73	14.71
Rural New Hampshire	5889.01	116.72	980.10	291.00	68.8	243.44	14.02
Rutland, VT	5863.01	123.98	976.77	314.00	68.9	257.84	14.28
Rural Vermont	5863.01	123.98	976.77	306.00	62.9	252.17	13.86
Chicago, IL	5722.01	114.10	953.28	1160.00	66.9	290.80	19.46
Dallas, TX	5944.01	109.69	990.27	332.00	58.7	282.28	13.98
Los Angeles, CA	6076.30	217.12	1008.66	1007.00	65.0	301.01	19.45
Miami, FL	5996.01	118.59	998.93	919.00	66.9	291.30	18.26
New York, NY	5933.31	202.11	984.93	1286.00	64.2	341.39	21.16
Washington, DC	5849.01	159.79	974.44	453.00	66.7	312.89	15.58
20-Area Average:	**$5893.04**	**$226.52**	**$ 981.41**	**$ 659.60**	**65.8c**	**$280.72**	**17.08c**

Source: ALA Auto and Travel Club.

Tables 8-4 and 8-5

Transportation Budgets

Tables 8-4 and 8-5 offer a breakdown of how much and where transportation funds will be spent in the region over the next five years.

Table 8-4

Boston Region Highway Element: Summary of Budgets

	FY '78	FY '79-'82	5-Year Total
Interstate Highways:	$24,900,000	$141,600,000	$166,500,000
Primary System:	54,803,000	187,485,000	240,288,000
Urban System:	50,287,000	76,727,000	127,114,000
Total Budget			$533,902,000

Source: Metropolitan Area Planning Council and the Central Transportation Planning Staff, 1977.

Table 8-5

Revised Transit Capital Budget, 1977

Project	Total	Local	Federal	FY77	FY78	FY79	FY80	FY81	After 1981
Approved									
Transition Quarter									
CRIP II	57.9	11.6	(46.3)						
B&M Purchase ROW	24.2	0.0	24.2*						
Major Project Engineering	3.8	0.8	(3.0)						
Red Line Car Mod.	17.6	3.5	(14.1)						
Charlestown Ph. II	16.5	3.3	13.2						
Plant & Equipment									
Transit Eff. Ph. I	8.4	1.7	6.7	6.7					
PCC Rehab. Ph. I (50 cars)	8.0	1.6	6.4	6.4					
Green Line Amendment Ph. I	10.0	2.0	8.0	8.0					
Bus Purchase (100)	44.5	9.0	35.5	7.1	7.1	7.1	7.1	7.1	
Immed. Needs Power Amend.	3.6	0.7	2.9	2.9					
Power Imp. Ph. III	29.4	5.9	23.5	23.5					
Track Imp. Ph. I	2.2	0.4	1.8	1.8					
Sta. Mod. Ph. III (Eng.)	1.9	0.4	1.5	1.5					
Everett Shops Rehab. Ph. I	5.0	1.0	4.0	4.0					
Power Cable Ph. I	8.0	1.6	6.4	6.4					
Malden Ctr. Garage	9.0	1.8	7.2	7.2					
PCC Rehab. Ph. II (50 cars)	8.0	1.6	6.4	6.4					
Track Imp. Ph. II	5.0	1.0	4.0	4.0					
Sta. Mod. Ph. III (Constr.)	13.3	2.7	10.6	10.6					
Transit Eff. Ph. II	7.8	1.6	6.2	6.2					
Further Track Imp.	15.8	3.2	12.6		3.2	3.2	3.2	3.0	
Green Line Amendment Ph. II	9.5	1.9	7.6		7.6				
Arborway Garage	15.8	3.2	12.6		12.6				

* Indicates loan from Interstate Transfer Funds.
** To be funded partially with UMTA Demonstration Grant ($1,000,000) and partially with Section 3 funds (Section 3 is now proposed as part of the Transit Efficiency Program).
Source: Central Transportation Planning Staff, 1977.

Project	Total	Local	Federal	FY77	FY78	FY79	FY80	FY81	After 1981
Everett Shops Ph. II	10.0	2.0	8.0			8.0			
Plant Imp. Ph. IV	12.7	2.5	10.2		10.2				
W/NW Bus Garage	15.0	3.0	12.0			12.0			
Plant Imp. Ph. V	20.0	4.0	16.0				16.0		
Ventilation	21.0	4.2	16.8	1.2	6.8		8.8		
CRIP III	233.0	46.6	186.4	30.0		30.0	30.0	30.0	66.4
Power Improvements IV	19.0	3.8	15.2		15.2				
Corridor Transit Service									
Blue, Wonderland-Lynn	131.1	26.1	(105.0)	(105.0)					
Red, Harvard-Alewife	386.5	77.3	(309.2)	(309.2)					
Alewife-Arl. Ctr.	68.5	13.7	(54.8)	(54.8)					
Arl. Ctr.-Arl. Hts.	170.5	34.1	136.4	136.4					
Orange Relocated SW	475.0	95.0	(380.0)	(380.0)					
Blue, Lynn-128	—	—	—						
Red, Arl. Hts.-128	49.0	9.8	39.2						39.2
Forest Hills-128	90.0	18.0	(72.0)		(72.0)				
Roxbury Replacement	165.0	33.0	132.0		(32.0)	40.0	30.0	30.0	
Oak Grove North	87.5	17.5	70.0						70.0
Blue, Airport Exp.	55.0	11.0	44.0			44.0			
South Braintree Amendment	30.0	6.0	(24.0)	(24.0)					
Core Transit Improvements									
Green, Lechmere-Ball Sq.	36.0	7.2	28.8				28.8		
Green, Kenmore-Brighton	7.5	1.5	6.0		6.0				
South End Replacement	25.0	5.0	20.0			20.0			
Brookline Village Ctr.	2.0	0.4	1.6			1.6			
Stuart Huntington Tunnel	56.9	11.4	45.5						45.5
Circ: Fenway	102.8	20.6	82.2						82.2
Grand Jct.	109.0	21.8	87.2						87.2
Sullivan Connector	38.8	7.8	31.0						31.0
No. Sta. Green Relocate	58.0	11.6	46.4					46.4	
No. Sta. Ped. Access	3.5	0.7	2.8		2.8				
Other Improvements									
Commuter Boat So. Shore	2.0	0.4	1.6		1.6				
So. Sta. Transp. Ctr.	20.0	4.0	16.0				16.0		
E&H Special Serv. Vans (16(b)2)	3.9	0.8	3.1	0.3	0.5	0.8	0.8	0.7	
Operating Assistance (§ 5)	104.6	52.3	52.3	16.9	18.5	16.9			
Commuter Rail Assist. (§ 17)	9.6	0.7	8.9	8.9					
Auto Restricted Zone (Transitway)**	1.72	0.12	1.6		1.6				
Cape Ann RTA									
Purchase of Buses	0.250	0.050	0.200	0.2					
Operating Assistance (§ 5)	0.065	0.058	0.007	0.007					
Totals:									
Section 3	1484.4	297.2	1187.2	270.3	73.1	165.9	139.9	116.5	421.5
Interstate Trnsfr.	1221.1	244.1	977.0	873.0	104.0	0	0	0	0
Section 5	104.6	52.3	52.3	16.9	18.5	16.9			
Section 17	9.6	0.7	8.9	8.9					
Section 16(b)2	3.9	0.8	3.1	0.3	0.5	0.8	0.8	0.7	
Demonstration Grant	1.0		1.0		1.0				

Figures 8-3 and 8-4

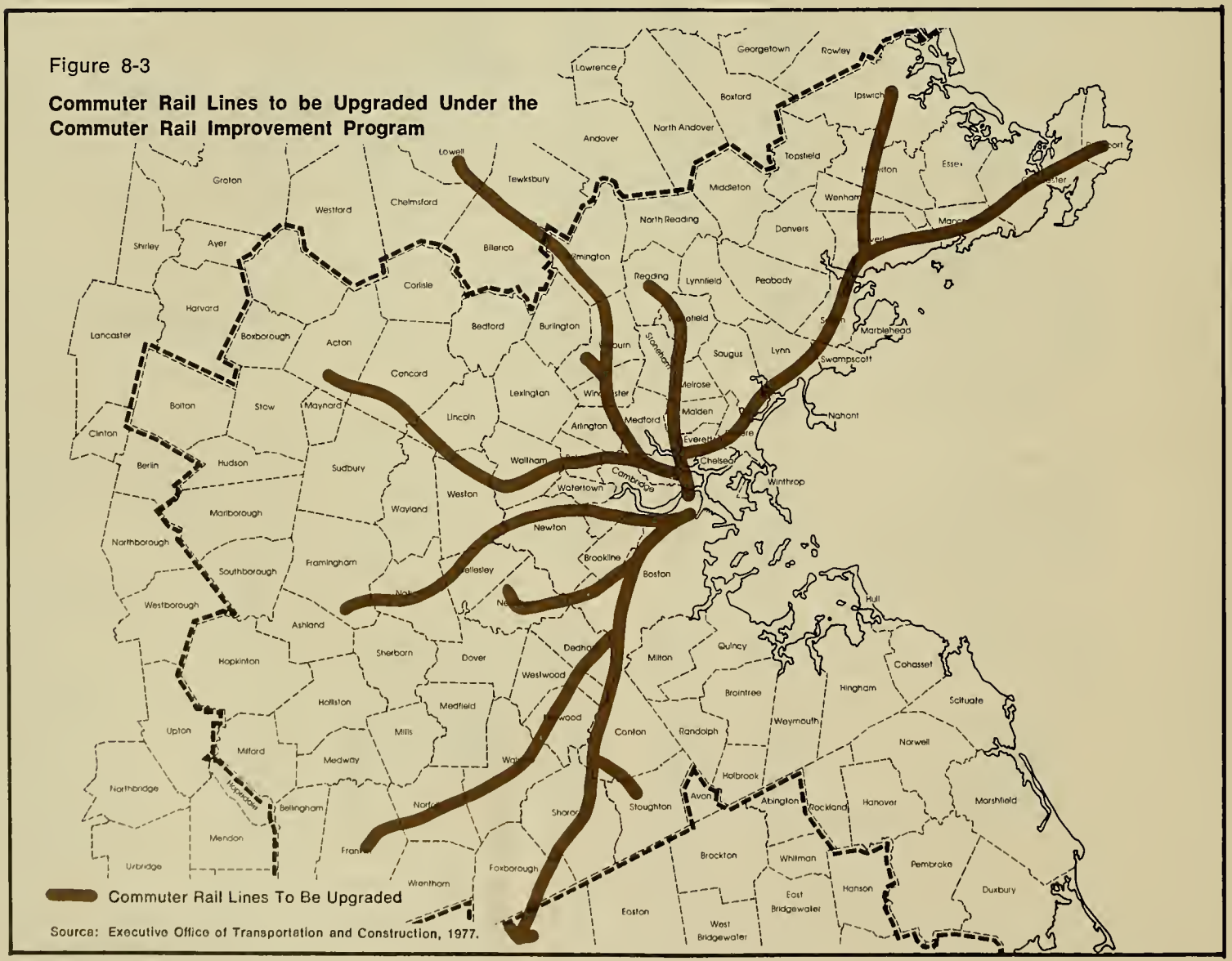
Proposed Transportation Projects

The Boston region has an old rail and rapid transit network which has suffered from low funding and erratic patronage. The rail and rapid transit systems are undergoing renovation now, and many new projects lie ahead. Much of what needs to be done will accommodate existing rights of ways and facilities, thus expenditures will tend toward renovation and the extension of existing services rather than the construction of wholly new services.

Figure 8-3 shows the work to be done on the commuter rail service. Figure 8-4 shows the proposed new service projects for the rapid transit network.

Figure 8-3

Commuter Rail Lines to be Upgraded Under the Commuter Rail Improvement Program



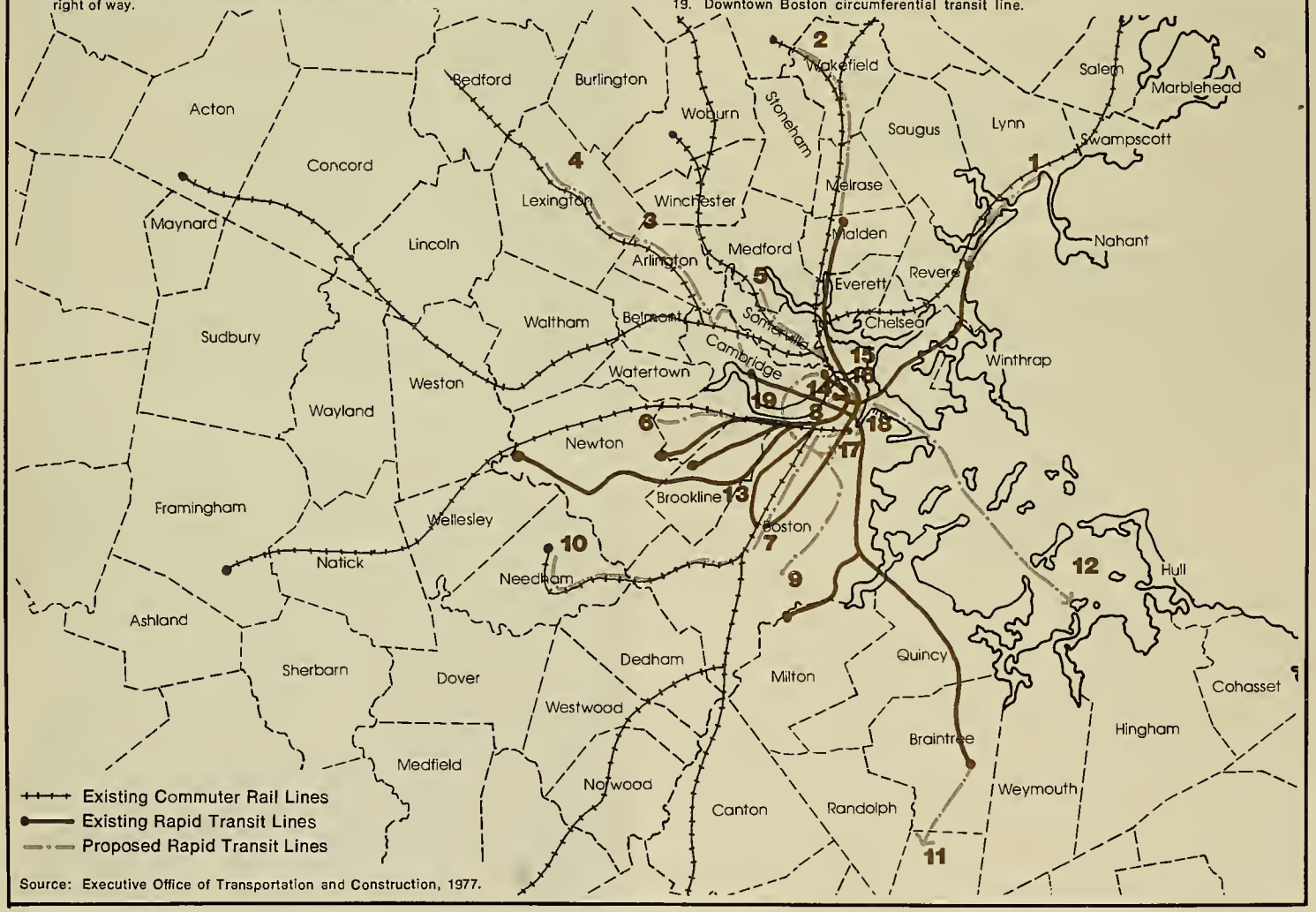
Source: Executive Office of Transportation and Construction, 1977.

Figure 8-4

Location of Proposed New Service Projects for Rapid Transit

Key

1. Blue line extension from Wonderland to Lynn Center.
2. Orange line extension from Oak Grove to a new terminus at Route 128.
3. Red line extension from Harvard Square to Arlington Heights.
4. Red line extension from Arlington Heights to Route 128.
5. Green line extension from Lechmere to a new terminus near Tufts University in Medford.
6. Green line extension of light rail service from Kenmore Square to Brighton.
7. Orange line relocation in the southwest corridor between Essex and Forest Hills stations.
8. South End service, either frequent buses or light rail vehicles along Weshington Street.
9. Roxbury Corridor service to the Grove Hall area.
10. West Roxbury and Needham service along the existing Needham branch railroad right of way.
11. Rail service to Brockton restored over the existing right of way through Quincy.
12. Commuter boat service connecting South Shore communites with Boston waterfront.
13. Brookline Village connector to the green line branch on Huntington Avenue.
14. Bowdoin-Charles connector: blue line extended to cross red line at Charles Street station.
15. Relocate Green line station at North Station to connect directly with the commuter train platforms.
16. North Station pedestrian way from Orange line station on Causeway Street to Commuter platforms at North Station through an underground tunnel.
17. South Station rehabilitation to be Boston's central transportation facility connecting buses, railroad and subway.
18. North Station-South Station connector through underground rail service parallel to central artery.
19. Downtown Boston circumferential transit line.



Source: Executive Office of Transportation and Construction, 1977.

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[1] Metropolitan Planning Organization is made up of: Metropolitan Area Planning Council, Executive Office of Transportation and Construction, Massachusetts Department of Public Works, Mass Port Authority, Massachusetts Bay Transportation Authority and Massachusetts Bay Transportation Authority Advisory Board.

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U.S. Route 114 Corridor Planning Study. Boston: Central Transportation Planning Staff, and Merrimack Valley Planning Commission, 1977.
MAPC Geographic Base File/DIME,[1] 44 School Street, Boston, MA 02108

[1] The Geographic Base File (GBF) is a computer representation of geographic and census features including streets, railroads, rivers, and town lines. Covering 44 MAPC communities, GBF printouts can be obtained for a fee by contacting MAPC.

Agency Contacts

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Massachusetts Parking Authority
Zero Charles Street
Boston, MA 02116

Massachusetts Port Authority (MassPort)
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Massachusetts Turnpike Authority
Prudential Center
Boston, MA 02199

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Central Transportation Planning Staff
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Photo Courtesy of Boston Edison

9
ENERGY

"Geochemical evidence suggests that every year about 28 million tons of carbon go into the formation of new fossil sediments. Current consumption of fossil fuels is about 6 billion tons of carbon per year. The rate of consumption is therefore over 200 times the rate of deposition. On this basis we can say that fossil fuels are limited and nonrenewable."

—I.T. Rosenqvist
1972 Conference on
Energy & Humanity

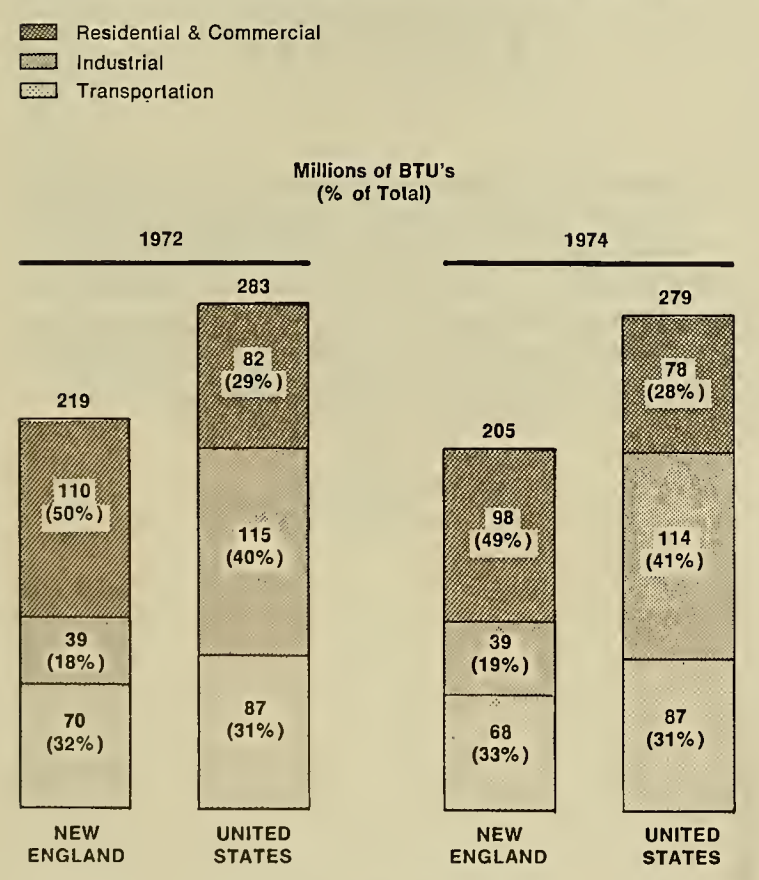
Part 1

Consumption & Sources

Figure 9-1

Comparison of New England and U.S. Per Capita Net Energy Consumption by Sector

A comparison between New England and U.S. per capita energy consumption shows New England's high residential and commercial usage. In 1972, 50 percent of New England's energy was consumed by residential and commercial uses, 32 percent by transportation and only 18 percent by industrial uses. Nationwide, 29 percent of energy was consumed by residential and commercial uses, 31 percent by transportation and 40 percent by industrial uses. In 1974, the figures remained almost unchanged.



Source: National Center for Analysis of Energy Systems, Brookhaven National Laboratory, 1976.
BTU—British Thermal Unit.

Table 9-1

Energy Consumption by Sector in 1974 (in trillion BTU's)

A comparison of energy consumption by sector among the five New England states shows that Massachusetts is the largest energy user.

State	Residential & Commercial	Industrial	Transportation	Agriculture
Connecticut	240.7*	88.0	193.0	4.9
Maine	102	57.6	93.0	1.8
Massachusetts	682.8	112.7	396.2	2.6
New Hampshire	72.9	19.9	54.9	0.8
Rhode Island	95	19.7	57.4	0.8
Vermont	40.0	7.1	32.0	0.7
New England	1,233.8	305.0	826.5	11.6

Source: Federal Energy Administration, 1976.
* The numbers in this table are to be used for their relative value only.

Table 9-2

Net Fuel Consumption for Massachusetts 1972-1975 (in trillion BTU's)

Fuel consumption in Massachusetts generally decreased between 1972 and 1975. The one exception was in consumption of electricity which increased in 1973 and leveled off slightly lower in 1974 and 1975.

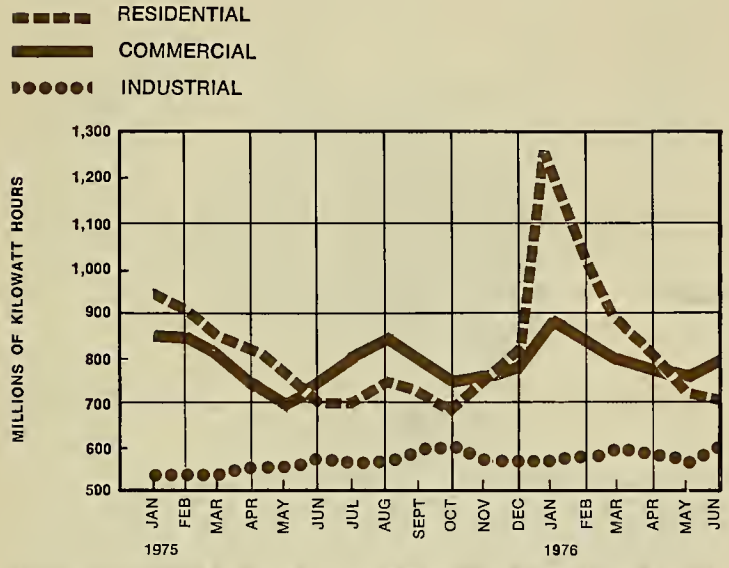
	1972	1973	1974	1975
Gasoline	286.2	295.3	287.0	287.7
Distillate	373.7	366.4	343.0	334.2
Residual	261.8	258.7	204.1	172.7
Electricity	95.6	103.7	100.2	100.9
Natural Gas	162.6	158.5	154.7	146.9
Other	72.9	75.5	67.9	70.0
Total	1,252.8	1,258.1	1,156.9	1,112.4

Source: Massachuaetts Executive Office of Consumer Affairs, Energy Policy Office, 1976.

Figure 9-2

Net Electricity Consumption for Massachusetts, 1975-1976

Examination of the net electricity consumption for Massachusetts during the period January 1975 through June 1976 shows a dramatic increase in electricity consumption during the winter months, especially among residential and commercial users. Industrial usage stays relatively constant.



Source: Massachusetts Executive Office of Consumer Affairs. Energy Policy Office, 1976.

Table 9-3

Summary of Preliminary Projections of Massachusetts Energy Requirements, by Major Consumer, by Source of Energy (Billions of BTU equivalents)

Current energy consumption levels compared with projected requirements indicate increased energy needs for Massachusetts over the next 20 years. Commercial energy requirements, for example, will be more than twice those in 1971.

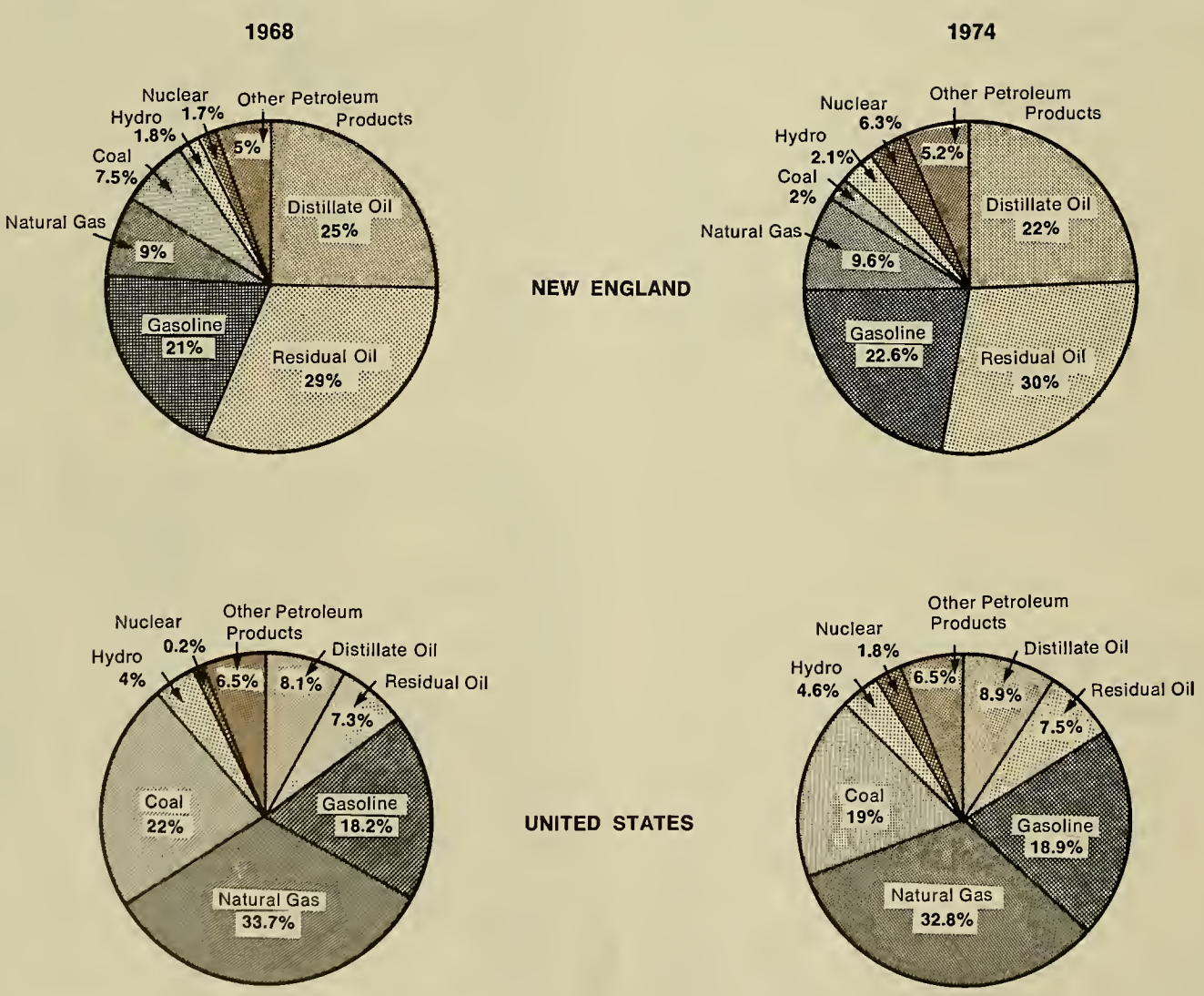
	1971	1974	1980	1990
Residential				
Coal	79	0	0	0
Natural Gas	86,104	85,529	82,841	71,486
LPG	3,466	1,841	2,079	2,463
Petroleum Products	171,440	177,955	192,400	232,663
Kerosene	(9,027)	(9,760)	(11,018)	(13,057)
Distillate	(162,413)	(168,195)	(181,382)	(219,606)
Electricity	33,536	44,500	66,963	96,657
Total Residential Energy Consumption	294,623	309,825	344,282	403,269
Commercial				
Coal	288	0	0	0
Natural Gas	33,456	30,473	32,152	27,884
LPG	1,055	536	628	780
Petroleum Products	321,274	361,721	434,667	675,363
Distillate	(139,963)	(157,584)	(189,363)	(294,223)
Residual	(181,311)	(204,137)	(245,304)	(381,140)
Electricity	26,755	35,404	47,358	81,307
Total Commercial Energy Consumption	382,828	428,134	514,805	785,334
Industrial				
Coal	2,384	1	1	1
Natural Gas	30,989	33,260	35,689	28,878
LPG	1,300	0	0	0
Petroleum Products	86,141	88,748	94,872	113,410
Gasoline	(357)	(0)	(0)	(0)
Distillate	(26,743)	(27,652)	(30,019)	(36,480)
Residual	(59,041)	(61,096)	(64,853)	(76,930)
Electricity	27,236	30,964	35,220	42,753
Total Industrial Energy Consumption	148,049	152,974	165,782	185,042
Transportation				
Petroleum Products	334,216	354,185	414,436	513,038
Gasoline	(270,120)	(286,852)	(339,317)	(425,318)
Kerosene	(36,452)	(37,142)	(40,587)	(46,116)
Distillate	(18,786)	(21,165)	(24,669)	(30,398)
Residual	(8,858)	(9,026)	(9,863)	(11,206)
Total Transportation Energy Consumption	334,216	354,185	414,436	513,038
Electric Utilities				
Coal	3,196	725	2,517	3,708
Natural Gas	10,232	8,363	0	0
Petroleum Products	273,722	319,098	269,616	187,088
Distillate	(7,235)	(9,348)	(7,630)	(5,351)
Residual	(266,487)	(309,750)	(261,986)	(181,737)
Total Electric Utilities Energy Consumption	287,150	328,186	272,134	190,795
Miscellaneous				
LPG	229	254	293	359
Petroleum Products	20,841	23,723	27,425	33,595
Gasoline	(703)	(789)	(912)	(1,117)
Kerosene	(3,623)	(4,058)	(4,691)	(5,747)
Distillate	(3,734)	(4,588)	(5,304)	(6,497)
Residual	(12,781)	(14,288)	(16,518)	(20,234)
Electricity	1,451	1,635	1,890	2,315
Total Miscellaneous Energy Consumption	22,521	25,612	29,608	36,269

Source: New England Regional Commission, 1975.

Figure 9-3

Comparison of New England and U.S. Energy Usage

A comparison between types of energy usage in New England and the entire United States in 1968 and 1974 shows New England's reliance on nuclear energy and distillate and residual oil. This, coupled with the area's cold winters, caused New England to be strongly affected by the energy crisis.



Source: National Center for Analysis of Energy Systems, Brookhaven National Laboratory, 1976.

Table 9-4

Net Annual Energy Consumption in 1974 (10^{12} Btu)

A comparison of the sources of fuel consumed by New England states further indicates Massachusetts' dependence on petroleum products, especially distillate fuel.

State	Gasoline	Dist. Oil	Diesel Oil	Resid. Oil	Jet Oil	Natural Gas	Liq. Gases	Electricity	Coal	Other	Total
Connecticut	165.8*	113.6	15.4	71.9	10.7	68.6	8.0	64.1	1.8	7.4	527.6
Maine	65.0	66.5	6.1	71.0	10.4	3.0	3.1	21.3	1.9	6.3	254.5
Massachusetts	287.0	324.3	18.7	204.1	38.8	154.7	8.2	100.2	3.1	18.0	1,156.9
New Hampshire	48.8	43.2	2.5	15.9	4.8	8.6	4.7	16.6	0.3	3.8	149.1
Rhode Island	46.5	43.7	4.1	27.2	0.7	22.6	1.6	15.5	—	11.3	173.3
Vermont	29.4	27.4	2.5	3.3	0.6	2.5	2.8	10.6	0.3	0.7	80.1
New England	642.5	618.7	49.3	393.4	66.0	260.1	28.4	228.2	7.4	47.5	2,341.4

Note: Totals do not include utility use of petroleum or coal.
Source: Federal Energy Administration, 1976.
* The numbers in this table are to be used for their relative value only.

Table 9-5

Energy Resources Used by Electric Utilities in 1974 (10^{12} Btu)

Electric utilities are large, individual energy users. The sources of fuel for Massachusetts utility companies is residual fuel and nuclear power. Hydro-electric power use by Massachusetts utilities is low when compared with Maine and New Hampshire.

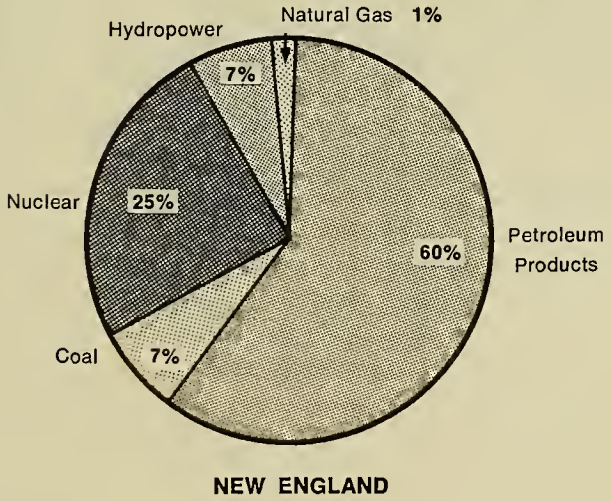
States	Distillate Fuel	Residual Fuel	Natural Gas	Nuclear	Hydro	Coal, Other	Total	Total Sales of Electricity
Connecticut	2.8	168.4	0.6	83.7	4.4	3.8 —	263.6	64.1
Maine	0.6	25.0	0.4	37.5	18.2	0.0 —	81.8	21.3
Massachusetts	5.3	232.2	7.5	30.3	3.7	16.0 —	295.1	100.2
New Hampshire	0.5	14.2	1.0	—	13.4	24.6 —	53.8	16.6
Rhode Island	0.3	11.2	2.0	—	—	1.6 —	15.1	15.5
Vermont	0.7	—	0.3	26.1	9.6	1.4 —	38.0	10.5
New England	10.2	451.0	11.7	177.6	49.4	47.4 —	747.3	228.2

Source: Federal Energy Administration, 1976.
Note: The numbers in this table are to be used for their relative value only.

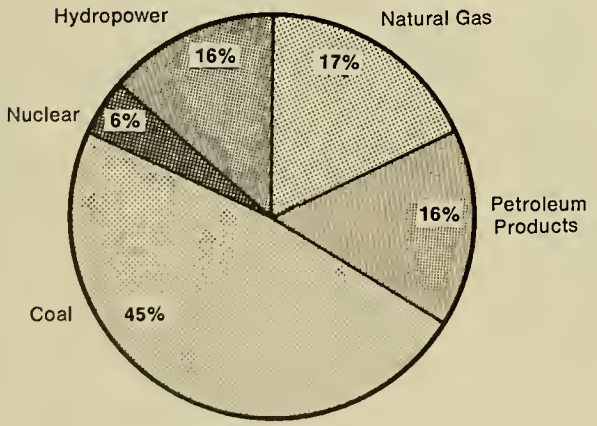
Figure 9-4

Comparison of New England and U.S. Electric Generation Fuel Sources in 1974

A comparison between sources of fuel for generating electricity for New England and the United States as a whole reveals New England's reliance on petroleum products. In New England, petroleum products account for 60 percent while the same figure is only 16 percent nationwide. On the other hand, 45 percent of the U.S. source is coal, but only 7 percent in New England.



NEW ENGLAND



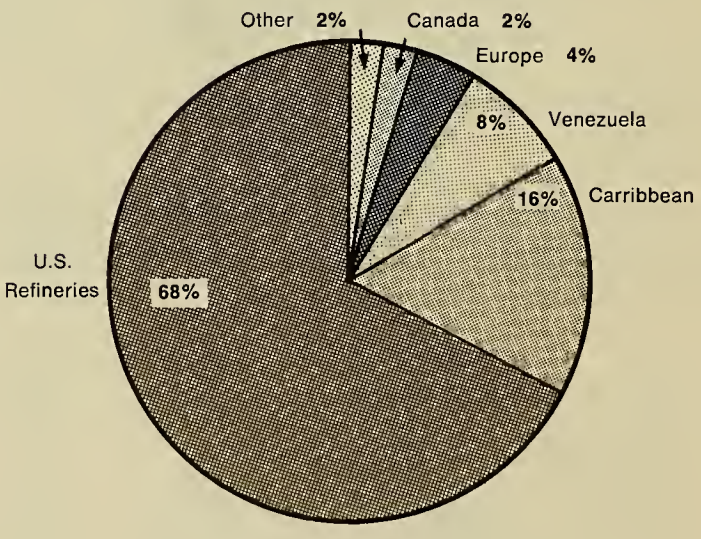
UNITED STATES

Source: Energy Resource Development Task Force, New England Federal Regional Council, 1976.

Figure 9-5

Sources of New England Refined Petroleum Products in 1974

U.S. refineries are the source of 68 percent of New England's refined petroleum products. The second largest source is the Caribbean with 16 percent followed by 8 percent from Venezuela.



Source: Federal Energy Administration Region I, 1976.

Part 2

Cost

Table 9-6

Comparison of Average Prices for Selected Energy Products in New England and U.S.

A comparison of energy prices between New England and the U.S. in 1972 and 1976 shows two things. First, energy prices are uniformly higher in New England compared with the U.S. Secondly, overall energy prices have increased, especially petroleum products.

Product		1972 New England	1972 U.S.	1976 New England	1976 U.S.
Regular Gasoline —Retail excluding taxes	(¢/gal)	27	24	44	45
Residential Heating Oil	(¢/gal)	21	20	41	40
Electricity —Total Sales	(¢/Kwh)	2.49	1.77	3.65	2.3
Electricity —Industrial	(¢/Kwh)	1.55	1.09	2.81	1.55
Residual Oil —Utility	(¢/10⁶Btu)	65	60	183	194
Natural Gas —Utility	(¢/10⁶Btu)	NA	65	166	87
Coal —Utility	(¢/10⁶Btu)	NA	48	124	80

Source: Center for Analysis of Energy Systems, Brookhaven National Laboratory, 1976.

Table 9-7

Price Per Kilowatt Hour for New England States in 1974

The 1974 price of electricity was fairly uniform among the six New England states, with Rhode Island and Massachusetts paying the highest rates. When New England and the U.S. are compared, it is clear that electricity costs are substantially more in New England.

State	Residential Sales ¢/kwh	Commercial Sales ¢/kwh	Industrial Sales ¢/kwh	Street Lighting Sales ¢/kwh	Other Sales ¢/kwh	Total Sales ¢/kwh
Connecticut	4.048	3.808	2.855	6.801	2.868	3.650
Maine	3.135	3.148	1.874	7.327	2.217	2.685
Massachusetts	4.344	4.126	3.126	7.342	3.055	3.946
New Hampshire	3.656	3.906	2.359	7.708	3.391	3.228
Rhode Island	4.552	4.014	3.282	6.141	3.529	4.000
Vermont	3.078	3.302	2.253	6.500	2.586	2.879
New England	4.031	3.925	2.810	7.070	2.870	3.647
United States	2.829	2.851	1.548	4.305	1.947	2.300

Sources: States—Electric Council of New England. U.S.—Edison Electric Institute.

Table 9-8

Net Monthly Bills to Residential Customers for Specified Amounts of Gas by Area

A comparison of net residential monthly bills for natural gas in metropolitan areas during October and November 1975 reveals that the Boston area ranked third. The highest payers were Honolulu and New York-N.E. New Jersey.

Monthly Bills for Use Other Than Heating

Standard Metropolitan Statistical Areas	10 Therms Oct. 1975	10 Therms Nov. 1975	25 Therms Oct. 1975	25 Therms Nov. 1975	40 Therms Oct. 1975	40 Therms Nov. 1975
Atlanta	3.19	3.32	5.26	5.60	7.16	7.70
Baltimore	3.91	3.92	7.20	7.23	10.48	10.52
Boston	6.50	6.94	11.27	12.37	15.40	17.14
Buffalo	4.80	4.77	8.32	8.25	11.84	11.81
Chicago-N.W. Indiana	3.01	3.06	5.86	5.97	8.64	8.81
Cincinnati	2.13	2.12	4.28	4.24	6.60	6.55
Cleveland	3.50	3.50	5.40	5.40	7.30	7.30
Dallas	2.13	2.13	4.13	4.12	6.21	6.20
Detroit	4.56	4.59	6.86	6.92	9.14	9.24
Honolulu	9.95	10.20	20.67	20.97	31.27	31.64
Houston	3.79	3.93	7.09	7.46	10.28	10.85
Kansas City	2.71	2.74	4.44	4.49	6.00	6.07
Los Angeles-Long Beach	4.60	4.60	6.64	6.63	8.58	8.56
Milwaukee	4.24	4.38	7.16	7.52	10.09	10.67
Minneapolis-St. Paul	3.42	3.46	6.39	6.49	8.98	9.14
New York-N.E. New Jersey	6.02	6.35	11.59	12.27	16.42	17.42
Philadelphia	3.85	3.89	7.92	8.03	11.74	11.91
Pittsburgh	3.85	3.87	6.23	6.29	8.59	8.67
St. Louis	3.16	3.15	6.78	6.78	9.96	9.99
San Diego	3.20	3.20	5.96	5.96	8.44	8.44
San Francisco-Oakland	2.74	2.74	4.89	4.89	6.96	6.96
Seattle	4.13	4.13	8.24	8.24	12.16	12.16
Washington, D.C.	4.21	4.22	8.06	8.08	11.73	11.77

Source: Bureau of Labor Statistics, 1975.

Table 9-9

Net Monthly Bills for Specified Kilowatt Hours of Electricity by Area

A comparison of net monthly bills for electricity in metropolitan areas during October and November 1975 shows the Boston area as the second highest payer. First, is the New York-N.E. New Jersey area and third is the Philadelphia area.

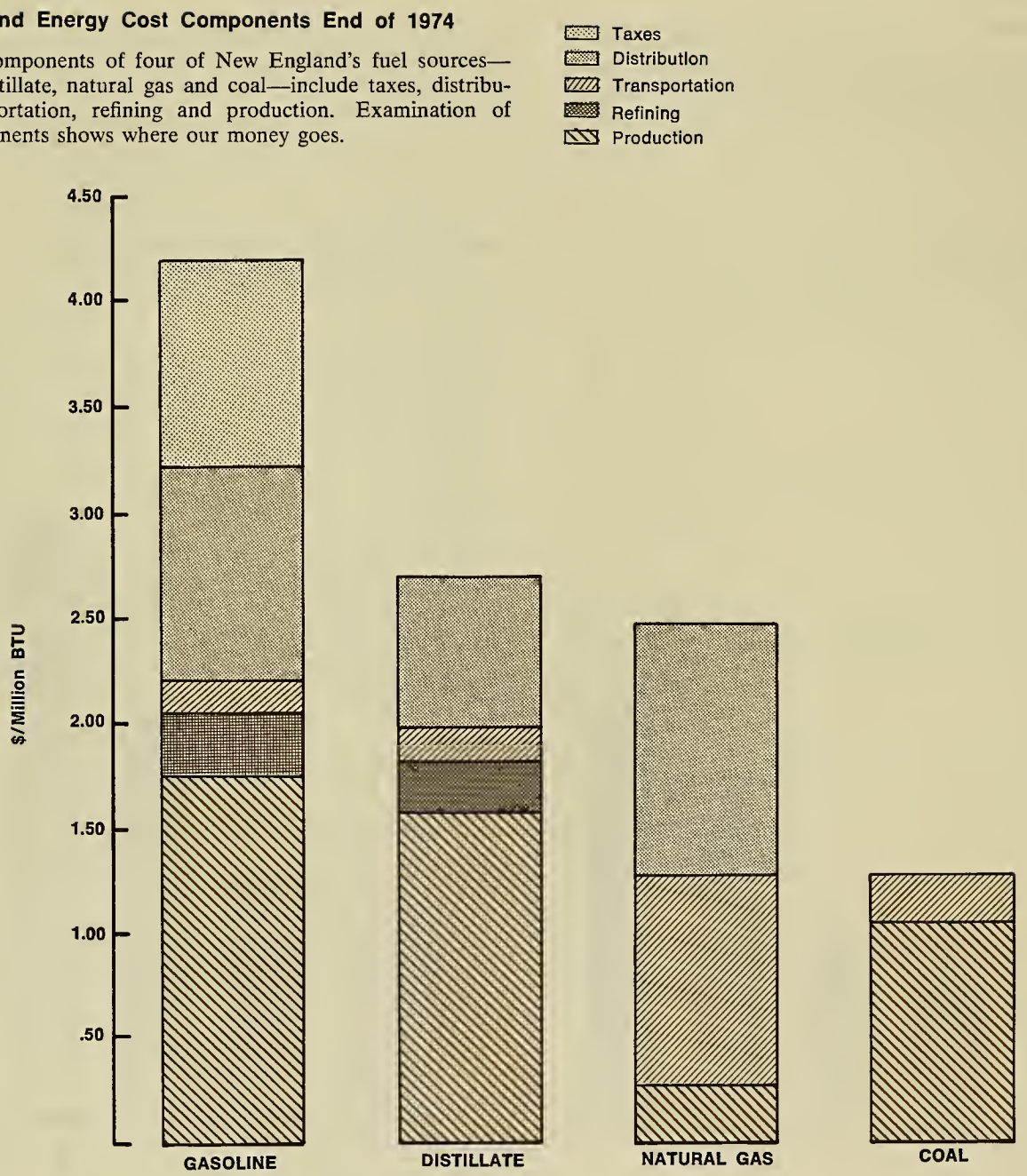
Standard Metropolitan Statistical Areas	100 Kwh Oct. 1975	100 Kwh Nov. 1975	250 Kwh Oct. 1975	250 Kwh Nov. 1975	500 Kwh Oct. 1975	500 Kwh Nov. 1975
Atlanta	5.73	5.70	9.56	9.50	18.13	18.01
Baltimore	6.61	6.61	13.85	13.85	23.54	23.54
Boston	7.61	7.54	15.45	15.29	25.26	25.29
Buffalo	7.41	7.56	12.88	13.17	19.77	20.30
Chicago-N.W. Indiana	6.25	6.19	12.23	12.06	21.54	21.19
Cincinnati	4.91	4.88	9.93	9.85	17.48	17.30
Cleveland	4.43	4.38	10.93	10.83	20.08	19.15
Dallas	5.47	5.57	10.57	10.83	17.24	17.78
Detroit	6.36	6.26	12.01	11.75	21.48	20.95
Honolulu	7.79	7.76	14.77	14.59	17.68	17.62
Houston	5.31	5.32	9.51	9.53	15.19	15.21
Kansas City	5.25	5.37	11.24	11.54	20.37	20.96
Los Angeles-Long Beach	6.27	6.65	12.01	12.76	19.84	21.13
Milwaukee	5.81	5.95	10.61	10.95	17.92	18.64
Minneapolis-St. Paul	6.23	6.23	11.71	11.71	20.85	20.85
New York-N.E. New Jersey	9.70	9.92	20.09	20.48	37.35	37.52
Philadelphia	5.67	5.50	13.76	13.25	25.24	24.05
Pittsburgh	6.50	6.55	12.53	12.66	22.20	22.45
St. Louis	4.69	4.68	10.31	10.31	18.16	18.16
San Diego	6.16	5.87	12.28	11.85	20.57	21.31
San Francisco-Oakland	4.52	4.52	8.82	8.82	15.47	15.47
Seattle	—	—	4.97	4.97	6.97	6.97
Washington, D.C.	6.18	6.11	12.36	12.16	21.62	21.11

Source: Bureau of Labor Stetistics, 1975.

Figure 9-6

New England Energy Cost Components End of 1974

Cost components of four of New England's fuel sources—gasoline, distillate, natural gas and coal—include taxes, distribution, transportation, refining and production. Examination of these components shows where our money goes.



Source: Federal Energy Administration Region I, 1975.

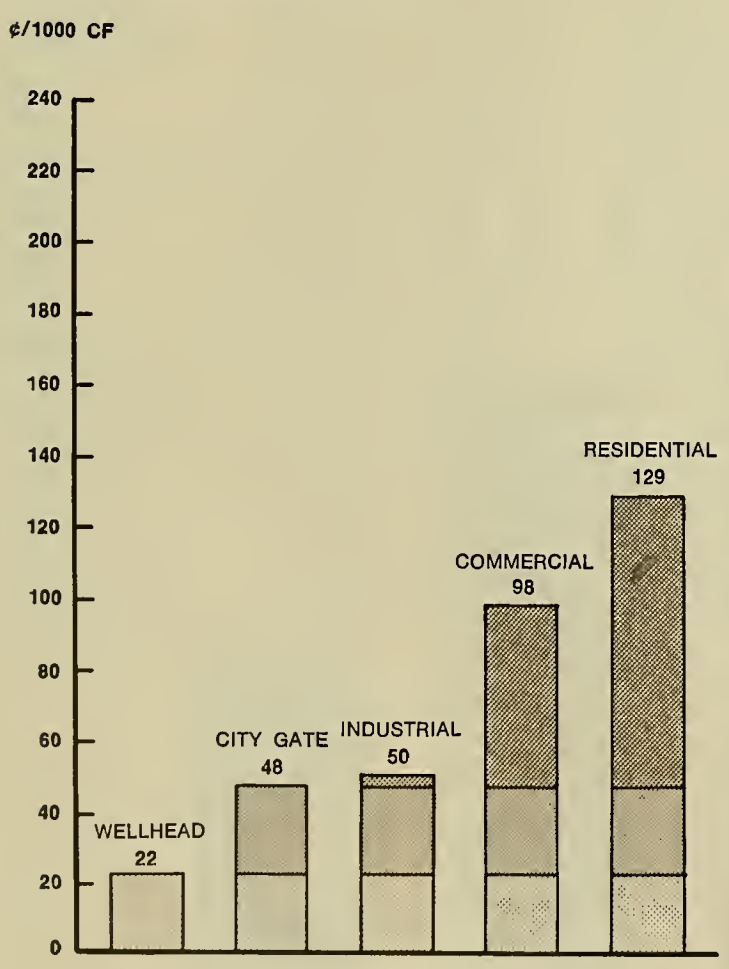
Figures 9-7 and 9-8

Average Gas Prices

Cost components of gas include cost of production, transmission and distribution. Examination of these costs by sector for the U.S. as a whole and New England shows where money for gas goes.

Figure 9-7

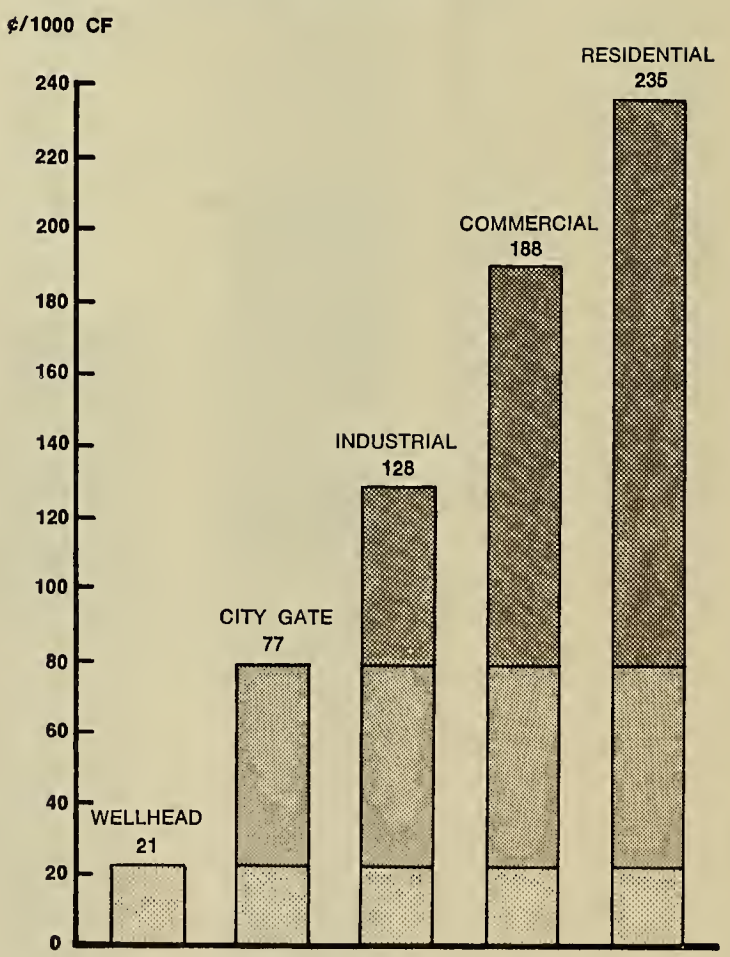
Average U.S. Gas Prices in 1975



Source: Institute of Gas Technology, 1976.
CF=Cubic Foot.

Figure 9-8

Average New England Gas Prices in 1973



Source: Institute of Gas Technology, 1976.

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10

SOLID WASTE AND SEWAGE

"Willful waste brings woeful want."

—Thomas Fuller

Table 10-1

Data on Volume of Residential Solid Waste for MAPC Communities (1970-2000)

Data on the volume of residential solid waste generated by communities in the MAPC region in 1970 and 1975 shows how solid waste levels are growing. Projected data shows our growing need for a method to dispose of our junk.

	1970		1975		1980		1985		1990		1995		2000	
Community	Waste[1]	Population[2]	Waste	Population	Waste	Population	Waste	Population	Waste	Population	Waste	Population	Waste	Population
Acton	15,829	14,770	20,322	19,050	25,221	22,103	28,112	24,250	30,988	25,500	33,487	26,500	36,595	27,500
Arlington	44,811	53,524	47,924	54,500	52,921	54,550	54,755	54,600	57,949	54,650	61,146	54,700	64,345	54,750
Ashland	9,586	8,882	11,090	9,750	13,482	10,800	15,104	11,750	18,192	12,700	21,400	14,950	25,173	17,200
Bedford	17,102	16,400	20,612	19,400	23,665	20,400	25,419	21,400	27,939	22,450	30,753	23,887	33,781	24,962
Bellingham	15,202	13,967	16,970	15,000	20,713	17,170	24,323	20,240	27,039	21,550	29,750	22,929	32,671	23,961
Belmont	20,931	28,285	25,333	31,085	29,078	31,985	31,227	32,885	34,254	33,785	37,827	35,170	41,779	36,295
Beverly	31,598	38,348	38,438	42,748	46,504	46,036	52,311	49,324	56,899	52,648	61,205	54,807	65,399	56,561
Bolton	1,713	1,905	2,403	2,400	3,570	3,100	5,092	3,900	6,765	4,600	8,010	4,931	8,406	5,252
Boston	353,959	641,071	375,197	610,500	414,132	608,375	428,290	606,925	453,068	606,250	477,845	606,750	502,622	607,000
Boxborough	1,164	1,451	1,572	1,700	1,881	1,811	2,533	2,129	3,408	2,504	4,094	2,704	4,839	2,859
Boxford	4,095	4,032	6,472	5,436	9,032	7,034	11,723	8,984	15,078	11,054	16,862	11,850	20,091	12,620
Braintree	28,102	35,050	33,496	38,350	39,989	40,783	44,478	43,217	50,353	45,650	55,372	47,522	60,967	49,043
Brookline	47,008	58,886	50,312	60,000	56,731	62,500	59,909	65,000	64,686	67,500	68,362	67,750	72,052	68,000
Burlington	17,596	21,980	20,903	24,700	23,063	24,690	23,838	24,675	24,500	24,650	25,126	26,228	28,402	27,408
Cambridge	63,996	100,361	65,161	94,200	72,306	95,000	75,026	95,500	79,576	95,900	83,983	96,000	88,338	96,000
Canton	17,649	17,100	20,943	19,800	27,229	24,300	25,987	28,800	32,918	32,800	37,444	34,900	42,044	36,471
Carlisle	2,795	2,871	3,307	3,161	3,956	3,395	4,720	3,643	5,659	3,909	6,707	4,190	7,963	4,462
Chelsea	20,280	30,625	21,445	27,625	25,407	29,025	28,071	30,425	31,595	31,825	34,929	33,130	38,610	34,190
Cohasset	7,639	6,954	9,003	7,800	11,118	8,800	12,843	9,900	15,008	11,000	17,065	12,000	20,792	13,250
Concord	16,906	16,148	18,874	17,300	20,299	20,000	21,750	23,000	23,013	25,500	26,410	27,132	29,824	28,353
Danvers	18,669	26,151	22,823	28,851	29,801	32,568	35,587	36,285	42,688	40,001	47,018	41,641	51,832	42,974
Dedham	19,503	26,938	20,561	26,838	23,294	27,321	24,711	27,805	26,796	28,288	29,700	29,448	32,891	30,390
Dover	4,652	4,529	5,015	4,600	7,928	6,100	10,215	7,750	12,681	9,200	14,171	9,862	15,937	10,503
Duxbury	8,365	7,636	9,440	8,200	13,720	11,000	18,420	14,000	22,141	16,650	23,632	17,083	25,606	17,591
Essex	2,569	2,670	3,115	3,000	4,421	3,750	5,959	4,500	7,574	5,250	8,441	5,628	9,470	5,994
Everett	35,983	42,485	37,693	42,085	43,133	43,318	46,191	44,552	50,536	45,785	55,571	47,662	61,184	49,187
Foxborough	15,398	14,218	17,441	15,569	21,484	18,013	24,465	20,391	27,694	22,206	30,481	23,627	33,479	24,690
Framingham	49,122	64,048	54,480	69,600	60,912	71,225	63,750	72,750	67,570	73,000	71,472	73,375	75,396	73,750
Franklin	15,775	14,700	18,625	17,000	24,670	21,500	22,396	26,000	29,322	30,150	33,438	32,080	37,608	33,524
Gloucester	20,566	27,941	23,149	29,141	29,801	30,657	30,315	32,174	34,127	33,691	37,688	35,072	41,627	36,194
Hamilton	7,052	6,373	7,932	6,800	10,409	8,200	12,354	9,500	15,499	11,380	19,359	13,000	21,790	14,150
Hanover	10,823	10,107	12,107	10,700	17,543	13,700	20,527	16,250	23,990	18,500	27,313	20,600	31,272	22,700
Hingham	19,602	19,600	22,930	22,200	20,663	25,200	25,602	28,500	31,697	31,900	36,083	33,942	40,535	35,469
Holbrook	12,508	11,775	13,767	12,250	17,360	13,500	19,300	14,925	21,191	15,700	22,760	16,250	25,727	17,700
Holliston	12,805	12,069	15,521	13,250	18,131	14,350	19,806	15,460	22,016	16,525	24,330	17,750	26,836	18,700
Hopkinton	6,656	5,981	7,878	6,750	10,409	8,200	12,537	9,650	15,137	11,100	18,888	12,550	21,624	14,000
Hudson	16,586	16,084	18,542	18,000	21,300	20,000	22,986	22,000	24,542	24,000	24,643	25,536	27,314	26,685
Hull	10,676	9,961	12,536	11,100	15,491	12,500	17,481	13,000	18,992	13,500	20,250	13,851	21,194	14,262
Ipswich	11,472	10,750	13,660	12,150	17,360	13,500	19,135	14,750	20,891	15,400	22,287	15,800	24,140	16,269
Lexington	24,748	31,886	26,682	32,286	30,608	33,219	32,853	34,153	36,019	35,086	39,752	36,525	43,885	37,694
Lincoln	8,258	7,567	8,896	7,700	11,059	8,750	12,965	10,000	14,749	10,800	15,821	11,081	17,237	11,410
Littleton	7,059	6,380	7,696	6,580	8,750	6,793	9,294	6,996	10,098	7,202	10,824	7,389	11,785	7,608
Lynn	59,872	90,294	61,166	85,000	67,633	85,250	70,193	85,750	74,438	86,100	78,896	86,800	83,539	87,750
Lynnfield	11,549	10,826	12,070	11,600	17,360	13,500	18,662	14,250	20,442	14,950	21,807	15,339	23,614	15,795
Malden	45,878	56,127	48,141	55,000	53,496	55,750	55,883	56,875	59,443	57,500	62,970	58,000	81,940	58,500

Community	1970		1975		1980		1985		1990		1995		2000	
	Waste[1]	Population[2]	Waste	Population	Waste	Population	Waste	Population	Waste	Population	Waste	Population	Waste	Population
Manchester	5,815	5,151	6,433	5,400	8,401	6,500	10,215	7,750	11,582	8,350	12,149	8,567	13,524	8,821
Marblehead	20,925	21,295	25,248	25,000	22,524	26,700	25,602	28,500	29,390	30,200	33,513	32,133	37,671	33,579
Marlborough	19,836	27,936	25,166	30,936	31,477	33,919	36,380	36,903	42,532	39,886	46,848	41,521	51,645	42,850
Marshfield	16,183	15,223	18,542	16,900	27,229	24,300	29,450	31,500	41,601	39,200	47,115	41,709	52,753	43,586
Maynard	10,422	9,710	11,679	10,300	13,886	11,125	14,798	11,500	16,107	11,850	17,299	12,153	19,986	12,519
Medfield	10,534	9,821	12,214	10,800	15,491	12,500	18,662	14,250	21,191	15,700	22,612	16,108	24,492	16,586
Medford	49,265	64,397	52,352	64,700	57,929	65,000	60,157	65,500	63,873	65,950	67,671	66,500	71,470	67,000
Medway	8,632	7,938	10,180	8,900	12,241	9,750	13,576	10,500	15,207	11,200	16,376	11,491	17,843	11,832
Melrose	26,120	33,180	29,260	34,580	32,254	34,546	33,315	34,513	35,197	34,480	38,855	35,894	42,905	37,043
Middleton	4,108	4,044	5,134	4,700	7,248	5,525	9,360	7,050	11,324	8,150	12,649	8,737	14,220	9,306
Milford	19,408	19,352	22,019	20,100	23,700	21,600	25,000	24,100	24,033	25,515	26,433	27,148	29,850	28,370
Millis	6,358	5,686	7,718	6,600	10,173	8,000	12,354	9,500	14,362	10,500	15,404	10,773	16,783	11,093
Milton	19,770	27,190	22,080	28,190	27,865	31,007	32,431	33,824	38,128	36,640	42,048	38,142	46,791	39,625
Nahant	4,192	4,119	5,371	4,900	6,983	5,300	8,993	6,750	11,065	7,950	12,358	8,522	13,890	9,076
Natick	23,869	31,057	25,976	31,657	31,524	33,957	35,551	36,250	40,729	38,550	44,884	40,138	49,496	41,422
Needham	22,482	29,748	24,393	30,250	28,060	31,164	30,197	32,082	33,186	32,998	36,664	34,351	40,507	35,450
Newton	60,189	91,066	64,965	93,750	73,025	96,500	77,132	99,750	83,560	103,500	88,959	105,000	94,154	106,000
North Reading	11,992	11,264	13,231	11,750	15,018	12,100	18,075	13,500	19,750	14,400	21,055	14,621	22,700	15,055
Norwell	7,245	7,796	9,090	9,100	12,000	11,250	17,953	13,500	21,241	15,750	24,330	17,750	27,779	19,550
Norwood	23,613	30,815	29,299	34,615	33,414	35,481	35,668	36,348	38,908	37,215	42,899	38,741	47,327	39,981
Peabody	41,914	48,080	47,438	53,380	53,085	54,893	55,651	56,407	59,663	57,920	64,239	60,295	68,692	62,224
Pembroke	11,920	11,193	15,976	13,800	19,918	16,300	21,970	17,750	24,690	19,200	26,370	19,699	28,593	20,284
Quincy	58,919	87,966	62,903	89,000	70,389	91,000	74,034	93,500	79,183	95,150	84,121	96,250	89,210	97,500
Randolph	19,606	27,035	24,378	30,235	32,675	34,885	39,756	39,535	48,365	44,185	53,206	45,997	58,598	47,469
Reading	21,877	22,539	20,855	27,100	25,872	29,400	29,578	31,600	34,478	33,950	39,181	36,123	43,967	37,749
Revere	36,698	43,159	40,023	44,159	45,581	45,292	48,594	46,426	52,943	47,559	58,194	49,509	62,218	51,093
Rockland	16,535	15,674	21,688	20,700	27,500	25,900	28,937	31,100	37,667	36,300	42,732	38,623	48,305	40,361
Rockport	6,307	5,636	7,183	6,100	10,173	8,000	12,660	9,750	15,525	11,400	16,648	11,692	18,140	12,039
Salem	33,938	40,556	36,761	41,256	40,370	41,090	41,536	40,923	43,712	40,756	48,135	42,427	53,053	43,785
Saugus	17,566	25,110	20,305	26,610	22,949	27,043	24,290	27,477	26,283	27,910	29,140	29,054	32,279	29,984
Scituate	17,550	16,973	20,364	19,100	27,594	24,700	27,911	30,300	37,124	35,900	42,128	38,198	47,231	39,917
Sharon	13,106	12,367	15,110	12,754	17,056	13,167	18,011	13,561	19,453	13,961	20,745	14,324	22,454	14,749
Sherborn	3,285	3,309	3,828	3,600	8,667	6,725	12,782	9,850	18,442	12,950	20,282	13,882	22,493	14,784
Somerville	59,252	88,779	61,166	85,000	67,753	85,500	70,441	86,250	74,910	87,000	79,283	87,500	83,684	88,000
Southborough	6,471	5,798	7,397	6,300	10,173	8,000	12,660	9,750	14,943	10,950	16,030	11,235	17,466	11,569
Stoneham	16,000	20,725	20,750	23,900	21,400	24,500	22,370	25,200	23,352	25,750	26,788	27,398	30,243	28,631
Stoughton	22,615	23,459	24,255	23,800	25,000	25,000	27,911	28,500	39,023	37,300	44,243	39,687	49,573	41,473
Stow	4,041	3,984	4,659	4,300	6,776	5,125	7,771	5,750	8,803	6,200	9,819	6,646	11,025	7,078
Sudbury	14,842	13,506	18,211	16,500	25,955	22,950	26,757	29,400	37,056	35,856	42,051	38,144	47,145	39,860
Swampscott	14,898	13,578	18,211	16,500	20,969	17,450	22,584	18,400	24,840	19,350	27,300	20,558	29,987	21,514
Wakefield	17,875	25,402	19,296	25,712	22,700	26,842	24,925	27,972	27,900	29,102	30,903	30,295	34,206	31,264
Walpole	18,468	18,149	21,109	20,000	24,283	25,700	30,091	32,000	38,481	36,900	43,639	39,262	48,904	41,029
Waltham	48,112	61,582	51,072	61,750	56,791	62,625	58,980	63,125	62,589	63,500	66,012	63,500	69,580	63,750
Watertown	32,614	39,307	34,571	39,307	38,117	39,273	39,377	39,240	41,611	39,207	45,844	40,814	50,547	42,120
Wayland	14,807	13,461	17,549	15,700	20,294	18,900	21,025	23,100	22,403	25,050	25,730	26,653	29,070	27,852
Wellesley	20,683	28,051	21,924	28,051	25,459	29,067	27,635	30,085	30,613	31,101	33,858	32,376	37,439	33,412
Wenham	3,890	3,849	4,896	4,500	5,841	4,833	7,771	5,750	8,932	6,300	9,965	6,754	11,189	7,193
Weston	11,594	10,870	13,499	12,000	15,360	12,389	17,253	12,759	18,627	13,135	19,858	13,477	21,480	13,877
Westwood	14,252	12,750	17,963	16,200	21,426	17,950	24,568	20,500	27,239	21,750	29,973	23,142	32,957	24,183
Weymouth	45,256	54,610	48,575	56,000	54,814	58,500	57,803	60,750	62,143	62,650	65,873	63,250	69,725	64,000
Wilmington	17,651	17,102	23,592	23,000	26,817	23,850	28,021	25,000	28,827	26,100	29,316	27,770	30,838	29,020
Winchester	21,686	22,269	23,178	22,500	25,767	22,700	26,836	22,900	28,489	23,000	31,365	24,472	34,081	25,573
Winthrop	20,176	20,335	24,255	23,800	26,589	23,600	27,309	23,400	28,689	23,200	31,588	24,685	34,276	25,796
Woburn	30,599	37,406	38,166	42,506	44,192	44,172	47,843	45,840	52,871	47,506	58,116	49,454	62,186	51,037
Wrentham	8,003	7,315	11,465	10,100	13,041	10,427	13,868	10,739	15,080	11,056	16,176	11,343	17,625	11,680

1 Annual tonnages based on Raytheon Service Company (RSC) survey of residential solid wastes.

2 1970 census data or projections used by RSC.

Source: Department of Public Works, 1972.

Table 10-2

Sewage Wasteload Estimates for 1995 for Communities in the MAPC Region

This table shows community wasteload estimates for the MAPC region in 1995. The estimates are preliminary figures generated by MAPC's Water Quality Project staff. Final figures were compiled and released in December 1977.

Community	Residential Loads Sewage (MGD)* Low	High	Non-residential Loads Sewage (MGD)* Low	High	Total Wasteloads Sewage (MGD)* Low	High
Boston	43.5	65.3	27.9	46.9	71.4	112.2
Acton	0.4	0.6	0.5	0.7	0.9	1.3
Arlington	4.0	6.0	0.4	0.7	4.4	6.8
Ashland	0.5	0.8	0.8	1.0	1.3	1.8
Bedford	1.1	1.6	2.2	3.0	3.3	4.6
Bellingham	0.6	0.9	0.1	0.3	0.7	1.2
Belmont	1.9	2.9	0.2	0.5	2.1	3.4
Beverly	3.7	5.6	1.2	2.0	5.0	7.7
Braintree	3.2	4.8	2.6	3.6	5.8	8.4
Brookline	4.5	6.7	0.5	1.2	5.0	7.9
Burlington	2.2	3.4	1.6	2.8	3.8	6.1
Cambridge	7.2	10.8	8.2	12.0	15.4	22.8
Canton	1.7	2.6	3.0	3.6	4.7	6.2
Chelsea	1.3	2.0	1.3	1.9	2.6	3.9
Cohasset	0.4	0.6	0.1	0.1	0.5	0.7
Concord	1.2	1.8	0.5	0.8	1.7	2.6
Danvers	2.1	3.2	1.2	1.8	3.4	5.0
Dedham	1.8	2.7	1.0	1.5	2.8	4.2
Dover	0.0	0.0	0.0	0.0	0.0	0.0
Duxbury	0.1	0.1	0.0	0.0	0.1	0.1
Everett	2.7	4.0	1.9	2.4	4.5	6.3
Framingham	5.3	7.9	4.5	5.9	9.7	13.8
Franklin	1.4	2.1	0.6	0.8	2.0	2.9
Hamilton	0.1	0.2	0.0	0.1	0.2	0.3
Hanover	0.2	0.3	0.2	0.3	0.4	0.6
Hingham	1.2	1.8	0.2	0.3	1.4	2.1
Holbrook	0.7	1.0	0.2	0.3	0.8	1.3
Hopkinton	0.7	1.1	0.2	0.3	0.9	1.3
Holliston	0.3	0.4	0.1	0.1	0.3	0.5
Hudson	1.5	2.3	1.1	1.4	2.6	3.7
Hull	0.5	0.7	0.0	0.1	0.5	0.8
Lexington	2.3	3.5	0.5	1.0	2.8	4.5
Lincoln	0.2	0.2	0.0	0.1	0.2	0.3
Littleton	0.2	0.3	0.3	0.4	0.5	0.7
Lynn	6.4	9.6	7.8	9.5	14.2	19.1
Lynnfield	0.3	0.4	0.0	0.1	0.3	0.6
Malden	4.3	6.5	2.4	3.1	6.7	9.6
Manchester	0.5	0.7	0.1	0.1	0.5	0.8
Marblehead	1.9	2.9	0.5	0.8	2.4	3.7
Marlborough	2.2	3.4	1.2	1.8	3.4	5.1
Marshfield	1.4	2.1	0.2	0.4	1.6	2.5
Maynard	0.8	1.2	1.0	1.2	1.8	2.4
Medfield	0.6	0.9	0.2	0.4	0.8	1.2
Medford	4.8	7.1	1.1	2.0	5.8	9.1
Medway	0.4	0.6	0.1	0.2	0.5	0.8
Melrose	2.2	3.4	0.5	0.8	2.7	4.2
Middleton	0.1	0.1	0.4	0.5	0.5	0.6
Milford	1.6	2.4	0.5	0.8	2.2	3.2
Millis	0.4	0.6	0.5	0.6	0.9	1.2
Milton	2.0	3.1	0.3	0.6	2.4	3.7
Nahant	0.4	0.6	0.0	0.1	0.4	0.6
Natick	2.5	3.7	1.6	2.4	4.1	6.1
Needham	2.3	3.4	1.4	2.0	3.6	5.4
Newton	6.8	10.3	3.0	4.7	9.8	15.0
Norfolk	0.1	0.2	0.1	0.1	0.2	0.3
N. Reading	0.4	0.7	0.1	0.2	0.5	0.8
Norwell	0.2	0.3	0.0	0.0	0.2	0.3
Norwood	2.4	3.6	1.6	2.3	4.0	5.8
Peabody	4.5	6.7	3.4	4.2	7.8	10.9
Quincy	6.6	9.9	3.5	5.2	10.1	15.1
Randolph	2.3	3.5	0.9	1.3	3.2	4.7
Reading	2.0	2.9	0.6	0.9	2.6	3.8
Revere	3.0	4.5	0.4	0.8	3.4	5.3
Rockland	1.0	1.5	0.6	0.9	1.7	2.4
Salem	2.7	4.1	2.3	3.2	5.0	7.3
Saugus	1.7	2.5	0.3	0.6	2.0	3.1
Scituate	1.0	1.5	0.2	0.3	1.2	1.9
Sharon	0.2	0.4	0.2	0.3	0.4	0.7
Sherborn	0.0	0.0	0.0	0.0	0.0	0.0
Somerville	5.9	8.9	1.8	2.7	7.7	11.6
Southborough	0.2	0.4	0.1	0.1	0.3	0.5
Stoneham	1.7	2.5	0.4	0.7	2.1	3.2
Stoughton	1.6	2.4	1.0	1.3	2.5	3.7
Stow	0.0	0.0	0.0	0.0	0.0	0.0
Sudbury	0.4	0.5	0.3	0.5	0.7	1.0
Swampscott	1.0	1.5	0.1	0.2	1.1	1.8
Topsfield	0.2	0.3	0.1	0.1	0.3	0.4
Wakefield	2.0	2.9	1.0	1.5	3.0	4.5
Walpole	1.5	2.3	3.8	4.3	5.4	6.6
Waltham	4.9	7.3	5.4	7.6	10.3	14.9
Watertown	2.6	3.9	1.4	2.1	4.0	5.9
Wayland	0.3	0.4	0.4	0.5	0.6	1.0
Wellesley	2.1	3.2	0.6	1.3	2.8	4.6
Wenham	0.1	0.1	0.0	0.1	0.1	0.2
Weston	0.3	0.4	0.1	0.3	0.4	0.7
Westwood	1.1	1.7	0.2	0.5	1.4	2.2
Weymouth	3.8	5.6	0.5	1.0	4.3	6.7
Wilmington	0.5	0.8	1.7	2.3	2.3	3.1
Winchester	1.6	2.4	0.3	0.5	1.9	2.9
Winthrop	1.3	2.0	0.1	0.2	1.5	2.3
Woburn	3.1	4.6	1.9	2.6	5.0	7.2
Wrentham	0.2	0.4	0.1	0.2	0.4	0.5

* MGD=Million Gallons Daily.

Source: MAPC Water Quality Project, 1977.

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Maps (in-house reference only)
Sewer Service Areas (scale: 1″ = 8000′)
Environmental Pattern I (scale: 1″ = 8000′)
Maps (available upon request)
Sewerage Districts (size: 8½″ x 11″)
Proposed Solid Waste Service Areas (size: 8½″ x 11″)
Sewerage Districts in MAPC region (size: 17″ x 22″)

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11

LAND USE

"I recognize the right and duty of this generation to develop and use our natural resources, but I do not recognize the right to waste them, or to rob by wasteful use, the generations that come after us."

—Theodore Roosevelt

Tables 11-1 through 11-7

Land Use Trends in the MAPC Region

An examination of the number of acres devoted to forest, agriculture, wetlands and urbanization in each MAPC community reveals local land use trends for the period between 1951 and 1971.

Table 11-1A

North Shore Subregion 1971 Land Use

Community	Forest Acres	Agriculture Acres	Wetland Acres	Urban Acres	Other Acres	Total Acres	Percent Urban
Beverly	4,254	769	627	3,929	347	9,926	39.6
Danvers	2,362	1,351	929	3,920	176	8,738	44.9
Essex	4,586	820	3,119	739	72	9,336	7.9
Gloucester	9,666	402	2,354	4,075	476	16,973	24.0
Hamilton	5,678	1,265	666	1,804	161	9,574	18.8
Ipswich	9,284	3,388	7,047	2,698	787	23,204	11.6
Lynn	2,319	83	682	4,008	292	7,384	54.3
Manchester	2,960	76	160	1,602	186	4,984	32.1
Marblehead	502	110	64	2,072	155	2,903	71.4
Nahant	99	17	12	448	161	737	60.8
Peabody	3,563	1,098	609	4,988	510	10,768	46.3
Rockport	2,636	242	289	1,251	218	4,636	27.0
Salem	1,339	752	1,138	2,424	363	6,016	40.3
Saugus	2,946	426	1,410	2,227	311	7,320	30.4
Swampscott	534	82	42	1,059	239	1,956	54.1
Topsfield	4,459	1,154	835	1,525	215	8,188	18.6
Wenham	3,051	714	449	1,014	93	5,321	19.1

Table 11-1B

Land Use Change 1951-1971

Forest %	Agriculture %	Wetland %	Urban %
—10.8	—56	86.6	28
—8.6	—61	80	82.5
1.3	—53	14.5	80
—15.0	—65	48.5	44
—4.5	—41.5	—25	212
1.5	—40	—3.2	129
—4.0	—76	13	—0.4
—20.0	—80	39	106
—0.2	—81	5	18.5
—	—87	—82.4	—17
—23.0	—64	—13.5	113.5
—18.5	—41.5	126	46
11.2	—49.6	8.4	6.8
—2.5	—48	—12.6	19
—6.8	—46	—4.5	—11
—8.0	—42	—18.5	362
2.5	—49.5	—11.3	138

Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1971.

Table 11-2A

North Subregion 1971 Land Use

Community	Forest Acres	Agriculture Acres	Wetland Acres	Urban Acres	Other Acres	Total Acres	Percent Urban
Bedford	3,910	738	686	3,381	225	8,940	38
Burlington	2,638	424	126	4,152	188	7,528	55
Lynnfield	3,019	442	657	2,354	304	6,776	35
Middleton	6,132	1,097	671	1,186	246	9,332	13
North Reading	5,059	497	686	2,086	352	8,680	24
Reading	3,033	170	151	2,817	217	6,388	44
Wakefield	1,443	166	511	2,855	137	5,112	56
Wilmington	5,176	679	493	4,221	507	11,076	38
Woburn	2,386	868	475	4,260	287	8,276	51

Table 11-2B

Land Use Change 1951-1971

Forest %	Agriculture %	Wetland %	Urban %
—22	—62	—20	190
—43	—76	—42	359
—25	—64	—14	216
—3	—28	—32	149
—16	—60	6	170
—2	—83	—64	51
—15	—71	—37	40
—29	—54	—29	164
—18	—58	—5	51

Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1971.

Table 11-3A

Northwest Subregion 1971 Land Use

Community	Forest Acres	Agriculture Acres	Wetland Acres	Urban Acres	Other Acres	Total Acres	Percent Urban
Acton	7,361	1,425	702	3,083	345	12,916	23.9
Bedford	3,910	738	686	3,381	225	8,940	37.8
Bolton	8,936	2,369	281	889	298	12,773	7.0
Boxborough	4,767	1,033	224	608	48	6,680	9.1
Carlisle	7,421	1,139	345	972	7	9,884	9.8
Concord	7,923	3,060	1,667	3,501	385	16,536	21.2
Lincoln	4,961	1,375	720	2,446	42	9,544	25.6
Littleton	5,892	2,509	913	1,910	116	11,345	16.8
Maynard	1,655	296	202	1,134	109	3,396	33.4
Stow	7,483	1,772	720	1,309	388	11,672	11.2

Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1971.

Table 11-3B

Land Use Change 1951-1971

Forest %	Agriculture %	Wetland %	Urban %
—7.7	—60.2	—13.5	459.5
—21.5	—62.0	—19.5	190.2
7.7	—39.3	—43.8	1,117.0
4.7	—42.9	—30.0	—
4.3	—43.8	—50.4	1,844.0
3.9	—43.1	—18.8	136.4
—14.8	—49.3	14.6	538.6
—2.8	—34.1	—9.1	307.2
0.4	—66.7	20.2	64.1
1.9	—44.8	—6.7	383.0

Table 11-4A

West Subregion 1971 Land Use

Community	Forest Acres	Agriculture Acres	Wetland Acres	Urban Acres	Other Acres	Total Acres	Percent Urban
Ashland	5,387	574	430	1,535	314	8,240	18.6
Framingham	6,138	1,326	1,208	7,687	489	16,848	45.6
Holliston	8,414	946	444	2,053	319	12,176	16.9
Hopkinton	12,741	1,445	1,300	2,155	299	17,940	12.0
Hudson	4,056	765	507	2,153	199	7,680	28.0
Marlborough	7,553	1,694	923	3,763	457	14,390	26.2
Milford	5,833	572	453	2,782	168	9,808	28.4
Natick	3,966	920	801	4,002	303	19,992	40.1
Sherborn	6,879	1,702	545	995	51	10,172	9.8
Southborough	5,489	1,279	1,170	1,722	184	9,844	17.5
Sudbury	8,174	2,476	1,346	3,367	313	15,676	21.5
Wayland	4,318	1,319	1,527	2,724	280	10,168	26.8
Wellesley	1,508	94	362	4,354	262	6,580	66.2
Weston	5,672	675	490	3,697	414	10,948	33.8

Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1971.

Table 11-4B

Land Use Change 1951-1971

Forest %	Agriculture %	Wetland %	Urban %
—3.9	—63.9	—0.2	150
—15.7	—73.7	2.4	129.5
1.1	—62.7	—35.5	226.9
—6.7	—40.8	—5.6	356.6
—5.9	—62.0	5.8	145.2
—3.4	—60.4	3.5	168.8
—12.5	—64.8	19.2	144.0
—8.6	—55.1	—8.1	46.5
11.2	—46.6	—16.4	581.5
8.9	—61.3	8.7	306.0
—9.2	—46.8	—17.1	741.8
—6.2	—56.2	—2.4	175.7
—33.5	—81.9	17.5	24.8
—16.3	—73.2	9.4	205.3

Table 11-5A

Southwest Subregion 1971 Land Use

Community	Forest Acres	Agriculture Acres	Wetland Acres	Urban Acres	Other Acres	Total Acres	Percent Urban
Bellingham	6,648	1,836	661	2,228	576	11,949	18.6
Canton	6,126	1,167	33	3,295	839	12,460	26.4
Dedham	2,761	171	696	3,171	159	6,958	45.6
Dover	6,416	1,200	299	2,011	44	9,970	20.2
Franklin	10,662	2,664	632	2,918	351	17,227	16.9
Foxborough	8,091	1,242	612	2,671	416	13,032	20.5
Medfield	5,734	1,096	766	1,768	115	9,479	18.7
Medway	4,037	1,677	111	1,384	163	7,372	18.8
Millis	4,251	1,578	654	1,003	342	7,828	12.8
Needham	2,864	357	632	4,184	157	8,194	51.1
Norfolk	6,855	1,537	536	1,074	157	10,159	10.6
Norwood	2,101	441	328	3,524	216	6,610	53.3
Sharon	10,262	1,218	733	2,795	424	15,432	18.1
Stoughton	5,674	663	299	3,564	292	10,492	34.0
Walpole	7,566	1,617	512	3,141	494	13,330	23.6
Westwood	3,705	561	159	2,507	186	7,118	35.2
Wrentham	9,262	2,501	785	1,509	390	14,447	10.5

Table 11-5B

Land Use Change 1951-1971

Forest %	Agriculture %	Wetland %	Urban %
—16.4	—21.6	—3.9	131.1
—19.6	—29.6	—31.0	95.6
—1.0	—75.0	—40.0	36.6
—13.3	—32.9	—8.8	341.0
—7.8	—25.9	—19.8	129.4
—11.9	—32.5	—24.6	124.3
—5.4	—39.8	—19.0	171.0
—6.7	—18.6	—51.3	82.6
—2.2	—24.0	—26.7	95.5
—19.1	—67.6	—19.8	51.5
—3.9	—20.5	—6.9	107.7
—23.4	—45.2	—62.4	62.3
—11.6	—32.9	—19.3	152.7
—16.3	—54.7	—40.2	103.7
—8.8	—31.2	—31.8	62.8
—13.8	—55.0	—49.0	100.9
—8.0	4.5	—2.4	78.2

Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1971.

Table 11-6A

South Subregion 1971 Land Use

Community	Forest Acres	Agriculture Acres	Wetland Acres	Urban Acres	Other Acres	Total Acres	Percent Urban
Braintree	3,467	352	637	4,278	366	9,100	47.0
Cohasset	3,936	221	348	1,769	138	6,412	27.6
Duxbury	8,095	1,477	2,135	3,197	550	15,454	20.7
Hanover	5,979	668	405	2,791	135	9,978	28.0
Hingham	8,501	583	725	4,399	293	14,501	30.3
Holbrook	2,868	274	111	1,364	152	4,769	28.6
Hull	250	59	82	1,159	188	1,738	66.7
Marshfield	9,498	1,144	3,469	3,928	639	18,678	21.0
Norwell	9,141	630	734	2,470	158	13,133	18.8
Pembroke	9,191	1,063	1,818	2,846	366	15,284	18.6
Randolph	2,474	337	472	3,200	86	6,569	48.7
Rockland	3,534	485	221	1,971	210	6,421	30.7
Scituate	4,725	467	1,899	3,686	504	11,281	32.7
Weymouth	4,219	245	1,148	5,587	329	11,528	48.5

Table 11-6B

Land Use Change

Forest %	Agriculture %	Wetland %	Urban %
—22.0	—60.8	—20.1	44.6
—11.9	—66.8	48.7	69.1
—17.6	—30.8	16.9	175.4
—16.8	—60.7	29.8	258.3
—4.2	—76.7	—7.5	88.4
—12.3	—25.9	—7.5	35.5
—1.5	—39.8	—23.4	—9.4
—14.2	—57.7	5.6	141.9
—12.2	—63.9	—7.8	1,327.7
—17.5	—52.1	10.3	905.7
—30.2	—54.1	—10.6	81.6
—13.4	—53.8	62.5	70.9
—22.4	—73.3	7.7	120.3
—9.0	—67.2	—16.4	17.1

Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1971.

Table 11-7A

Inner 128 Subregion 1971 Land Use

Community	Forest Acres	Agriculture Acres	Wetland Acres	Urban Acres	Other Acres	Total Acres	Percent Urban
Arlington	191	23	243	2,874	153	3,484	82
Belmont	490	120	81	2,021	208	2,920	69
Boston	2,262	988	1,925	23,907	2,162	31,244	77
Brookline	567	80	58	3,235	419	4,359	74
Cambridge	106	18	562	3,697	309	4,692	79
Chelsea	—	57	203	1,306	38	1,604	81
Everett	8	7	196	2,092	41	2,344	89
Lexington	3,153	790	895	5,809	325	10,972	53
Malden	440	52	30	2,582	148	3,252	79
Medford	1,485	88	436	3,412	227	5,648	60
Melrose	789	14	58	1,939	186	3,036	64
Milton	3,845	450	362	3,572	266	8,495	42
Newton	1,461	156	354	8,437	844	11,252	75
Quincy	3,586	372	806	5,484	504	10,752	52
Revere	181	193	854	2,487	339	4,054	61
Somerville	7	—	69	2,443	117	2,636	93
Stoneham	1,667	191	452	1,812	210	4,332	42
Waltham	2,411	501	878	4,866	156	8,812	55
Watertown	92	53	76	2,324	163	2,708	86
Winchester	1,233	105	219	2,365	138	4,060	58
Winthrop	—	25	74	985	172	1,256	78

Table 11-7B

Land Use Change 1951-1971

Forest %	Agriculture %	Wetland %	Urban %
—50.5	—89.4	—22.6	11.9
—17.2	—67.8	—39.1	10.9
—10.7	—22.2	5.4	—6.7
—8.3	—80.5	41.5	—1.6
307.7	—55.0	—7.0	—8.1
—	—	—14.3	—4.5
—20.0	—82.1	—31.2	4.1
—19.9	—77.5	42.1	100.9
27.9	—46.9	—51.6	—6.0
8.6	—63.3	—32.3	0.5
1.9	—92.9	—58.9	0.8
—1.1	—54.6	—28.7	14.9
—19.5	—82.0	—19.5	3.8
—13.2	—40.9	—19.5	9.8
105.7	—39.9	—17.9	—4.5
—	—	15.0	5.2
—7.6	—70.6	—4.8	29.2
—24.2	—66.8	16.8	44.3
17.4	—81.9	0	—0.4
0.4	—82.8	11.2	16.8
—	108.3	23.7	—14.1

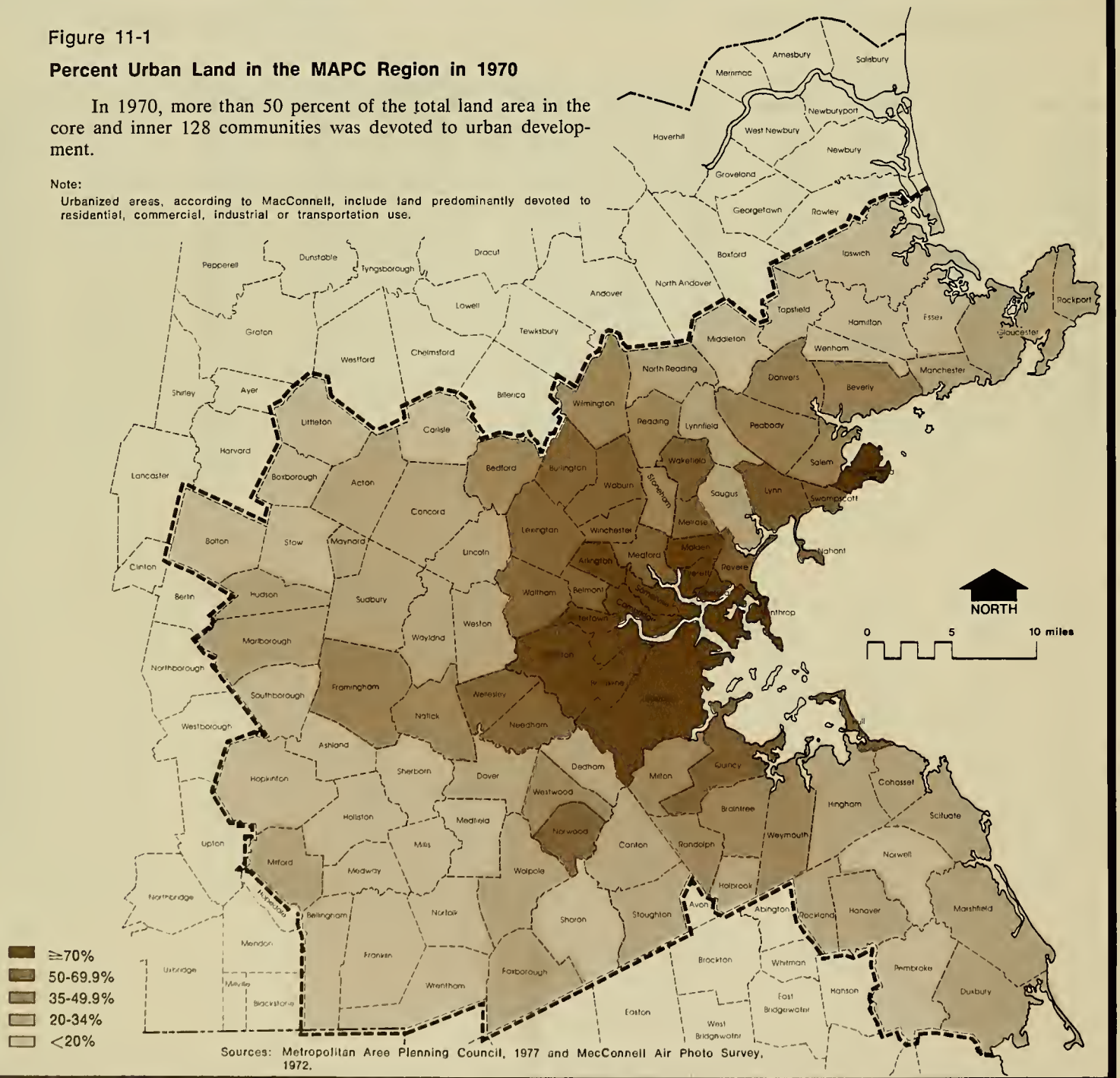
Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1971.

Figure 11-1

Percent Urban Land in the MAPC Region in 1970

In 1970, more than 50 percent of the total land area in the core and inner 128 communities was devoted to urban development.

Note:
Urbanized areas, according to MacConnell, include land predominantly devoted to residential, commercial, industrial or transportation use.



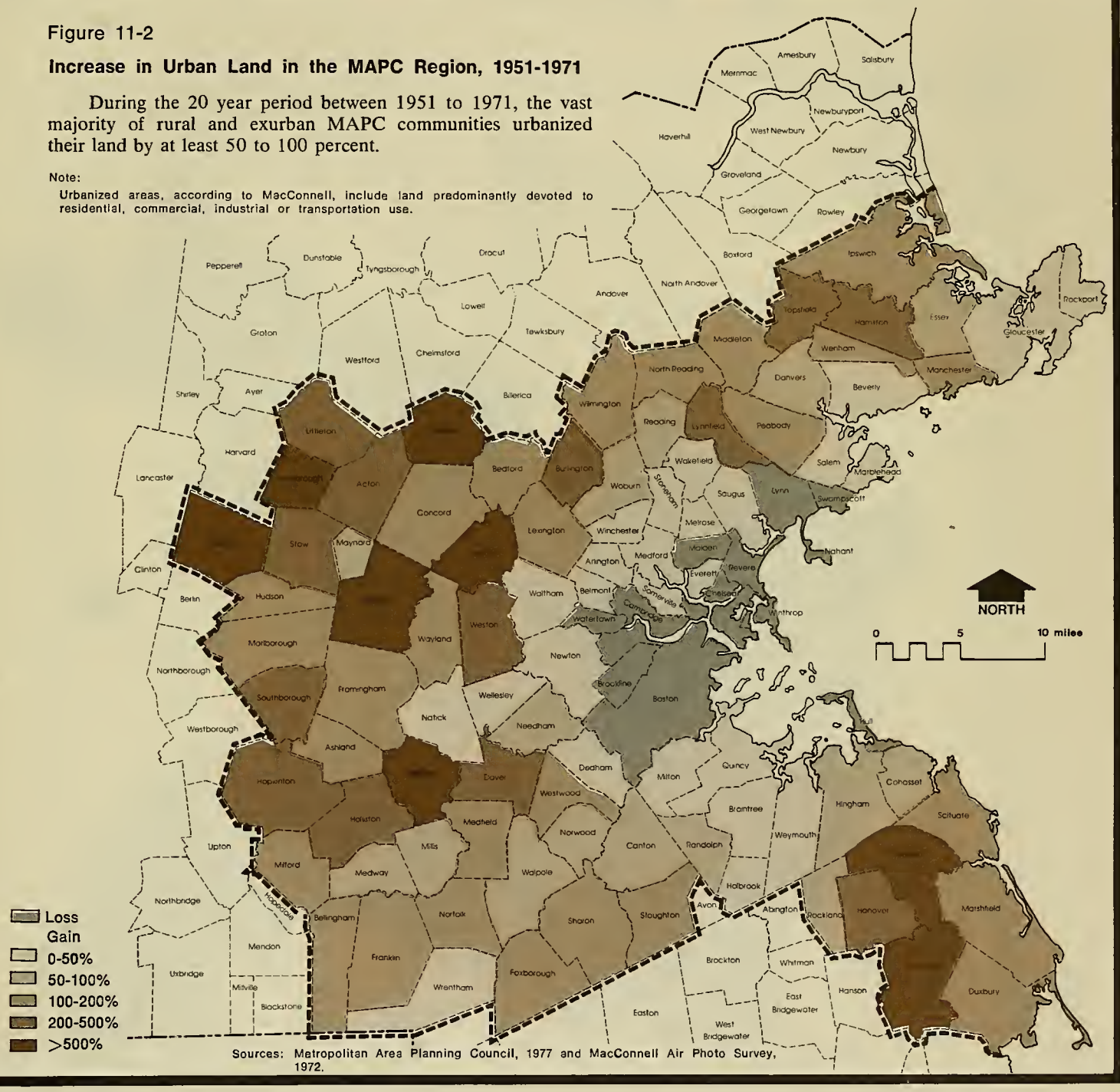
Sources: Metropolitan Aree Planning Council, 1977 and MecConnell Air Photo Survey, 1972.

Figure 11-2

Increase in Urban Land in the MAPC Region, 1951-1971

During the 20 year period between 1951 to 1971, the vast majority of rural and exurban MAPC communities urbanized their land by at least 50 to 100 percent.

Note:
Urbanized areas, according to MacConnell, include land predominantly devoted to residential, commercial, industrial or transportation use.

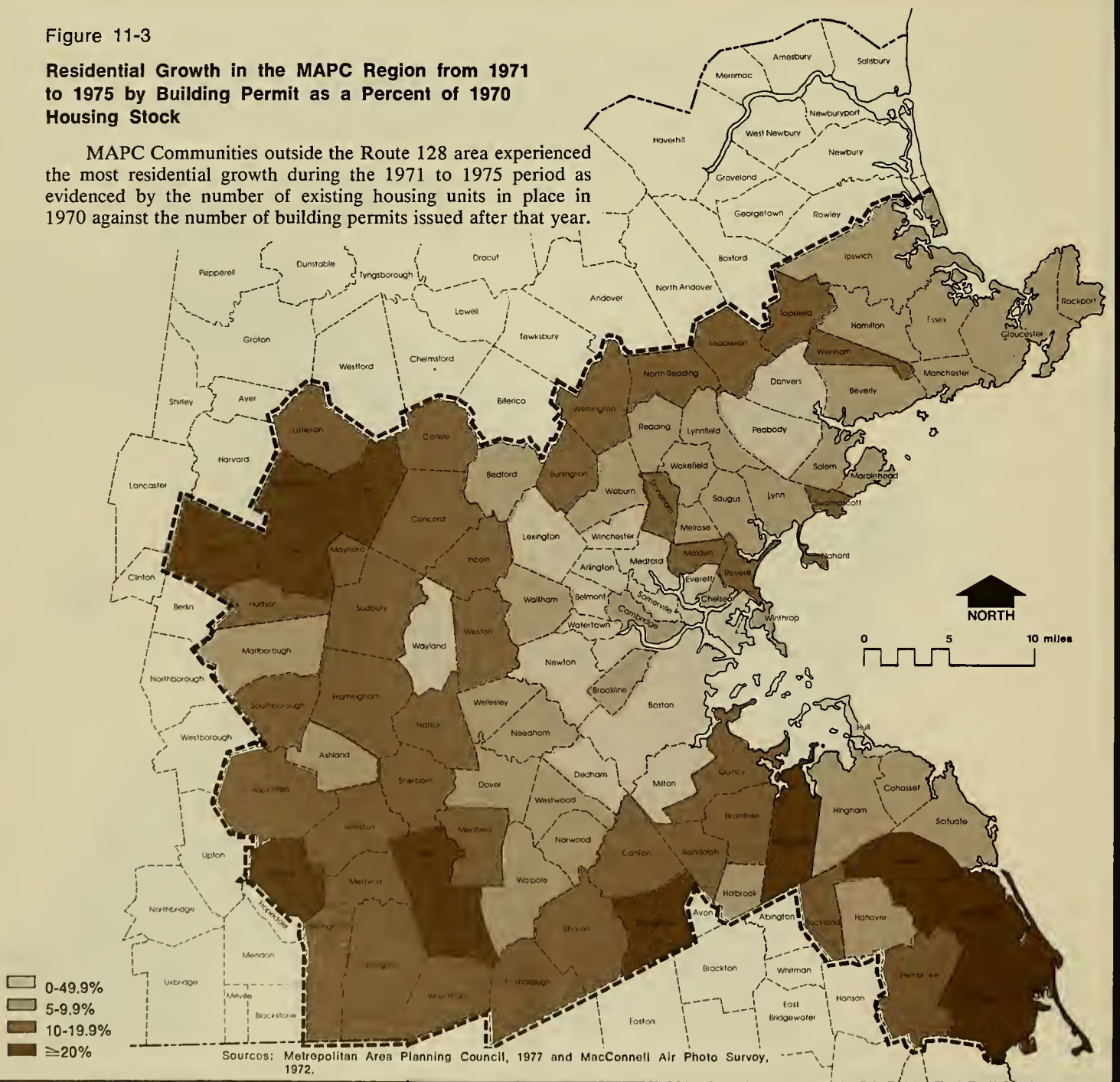


Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1972.

Figure 11-3

Residential Growth in the MAPC Region from 1971 to 1975 by Building Permit as a Percent of 1970 Housing Stock

MAPC Communities outside the Route 128 area experienced the most residential growth during the 1971 to 1975 period as evidenced by the number of existing housing units in place in 1970 against the number of building permits issued after that year.



Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1972.

Table 11-8

Percentage of Open Space by Municipality in the MAPC Region

MAPC communities have varying amounts and types of open space. However, present and projected open space and recreation inadequacies exist throughout the region.

Municipality	Open Space Recreational[1]	Open Transitional[2]	Forest[3]	Total Acres
Acton	0.40	5.10	56.99	12,916
Arlington	4.39	1.26	5.48	3,484
Ashland	1.44	1.96	65.37	8,240
Bedford	1.81	3.95	43.73	8,940
Bellingham	1.38	8.36	55.63	11,949
Belmont	6.74	3.01	16.78	2,920
Beverly	2.71	3.33	42.85	9,926
Bolton	1.93	3.45	69.96	12,773
Boston	6.08	4.33	7.23	31,244
Boxborough	0.16	5.74	71.36	6,680
Braintree	3.05	4.70	38.09	9,100
Brookline	9.19	0.91	13.00	4,359
Burlington	1.16	7.05	35.04	7,528
Cambridge	5.45	2.49	2.25	4,693
Canton	4.67	4.36	49.16	12,460
Carlisle	0.07	3.59	75.08	9,884
Chelsea	1.68	11.40	—	1,604
Cohasset	2.15	3.16	61.38	6,412
Concord	1.75	4.40	47.91	16,536
Danvers	1.13	5.68	27.03	8,738
Dedham	1.86	1.91	39.68	6,958
Dover	0.37	6.25	64.35	9,970
Duxbury	2.92	4.34	52.38	15,454
Essex	0.62	1.87	49.12	9,336
Everett	1.57	2.64	0.34	2,344
Foxborough	2.17	6.42	62.08	13,032
Framingham	2.16	4.03	36.43	16,848
Franklin	0.68	6.84	61.89	17,227
Gloucester	1.89	2.19	56.94	16,973
Hamilton	1.56	1.23	59.30	9,574
Hanover	0.40	3.91	59.92	9,978
Hingham	1.52	1.17	58.62	14,501
Holbrook	0.62	4.27	60.13	4,769
Holliston	0.47	1.61	39.73	21,176
Hudson	0.57	2.60	52.81	7,680
Hull	10.18	4.83	14.38	1,738
Ipswich	2.86	4.94	40.01	23,204
Lexington	2.41	4.19	28.73	10,972
Lincoln	0.28	4.97	51.98	9,544
Littleton	0.42	4.75	51.93	11,345
Lynn	2.97	1.89	31.40	7,384
Lynnfield	4.48	5.37	44.55	6,776
Malden	2.95	2.61	13.53	3,252
Manchester	3.37	1.72	59.39	4,984
Marblehead	5.33	3.27	17.29	2,903
Marlborough	1.54	5.10	52.48	14,390
Marshfield	1.92	3.16	50.85	18,678
Maynard	2.03	7.95	48.73	3,396
Medfield	0.54	5.14	60.49	9,479
Medford	3.55	4.33	26.29	5,648
Medway	0.55	9.11	54.76	7,372
Melrose	5.03	0.92	25.98	3,036
Middleton	1.65	4.85	65.70	9,332
Milford	0.87	5.31	59.44	9,808
Millis	2.04	6.18	54.30	7,828
Milton	2.76	3.08	45.26	8,495
Nahant	21.84	2.84	13.43	737
Natick	2.49	4.51	39.69	9,992
Needham	1.51	2.42	34.95	8,194
Newton	7.24	1.03	12.98	11,252
Norfolk	0.33	6.92	67.47	10,159
No. Reading	3.01	5.64	58.28	8,680
Norwell	0.10	2.45	69.60	13,133
Norwood	2.70	5.67	31.78	6,610
Peabody	2.28	7.33	33.08	10,768
Pembroke	1.19	2.99	60.13	15,284
Quincy	2.30	5.25	33.35	10,752
Randolph	0.68	5.43	37.66	6,569
Reading	2.98	2.31	47.47	6,388
Revere	7.44	6.70	4.46	4,054
Rockland	1.51	7.10	55.03	6,421
Rockport	3.40	2.43	56.85	4,636
Salem	5.25	12.28	22.25	6,016
Saugus	1.59	5.58	40.24	7,320
Scituate	3.75	2.23	41.88	11,281
Sharon	1.92	4.61	66.49	15,432
Sherborn	0.14	5.82	67.63	10,084
Somerville	3.60	0.83	0.26	2,636
Southborough	1.79	3.44	55.76	9,844
Stoneham	4.75	3.30	38.48	4,332
Stoughton	1.09	3.12	54.07	10,492
Stow	2.27	5.40	64.11	11,672
Sudbury	1.44	5.35	52.14	15,676
Swampscott	8.02	3.42	27.30	1,956
Topsfield	2.12	3.89	54.45	8,188
Wakefield	2.36	2.89	28.22	5,112
Walpole	1.12	6.81	56.75	13,330
Waltham	1.52	2.98	27.36	8,812
Watertown	5.87	1.03	3.39	2,708
Wayland	2.31	3.25	42.46	10,168
Wellesley	3.87	1.26	22.91	6,580
Wenham	1.74	2.33	57.33	5,321
Weston	3.12	4.44	51.80	10,948
Westwood	2.19	5.02	52.05	7,118
Weymouth	1.40	2.68	36.59	11,528
Wilmington	1.16	6.29	46.73	11,076
Winchester	3.39	2.21	30.36	4,060
Winthrop	11.70	3.66	—	1,256
Woburn	1.11	9.22	28.83	8,275
Wrentham	0.37	7.71	64.11	14,447

[1] Open Space Recreation—those areas that are used for active recreation purposes such as ball fields, playing courts, etc.
[2] Open Transitional—open areas that are not necessarily used for open space or recreation purposes, i.e., dumps, vacant lots, etc.
[3] Forest—open areas that are covered by natural vegetation. This category includes active and passive recreation areas and private undeveloped lands.

Note: Hopkinton—Total Acreage 28.1 sq. miles. Open Space 1,497.54 (9% of Total).

Source: Study Element Number 3.05 of the Southeastern New England Study, 1973.

Table 11-9

Percentage of Wetland Acreage by Municipality in the MAPC Region

Flood control, domestic water supply and recreation potential are just some valuable characteristics of inland and coastal wetlands. While present wetland laws and regulations have lessened possibilities for abuse, more local control is needed to insure further protection of valuable wetland acres.

Municipality	% Inland Wetland	% Coastal Wetland	Total Acreage
Acton	3.73	—	12,916
Arlington	0.74	—	3,484
Ashland	0.82	—	8,240
Bedford	7.13	—	8,940
Bellingham	3.96	—	11,949
Belmont	1.57	—	2,920
Beverly	1.39	0.42	9,926
Bolton	1.63	—	12,773
Boston	0.79	1.09	31,244
Boxborough	3.08	—	6,680
Braintree	2.61	0.16	9,100
Brookline	—	—	4,359
Burlington	1.67	—	7,528
Cambridge	0.98	—	4,693
Canton	5.08	—	12,460
Carlisle	2.81	—	9,884
Chelsea	—	—	1,604
Cohasset	1.12	1.69	6,412
Concord	6.47	—	16,536
Danvers	3.95	0.65	8,738
Dedham	6.89	—	6,958
Dover	1.74	—	9,970
Duxbury	4.18	6.38	15,454
Essex	4.70	19.99	9,336
Everett	0.17	0.63	2,344
Foxborough	1.13	—	13,032
Framingham	1.25	—	16,848
Franklin	2.90	—	17,227
Gloucester	1.25	5.17	16,973
Hamilton	3.85	0.44	9,574
Hanover	3.10	—	9,978
Hingham	1.75	1.07	14,501
Holbrook	0.77	—	4,769
Holliston	1.35	—	21,176
Hudson	4.47	—	7,680
Hull	0.23	4.25	1,738
Ipswich	2.60	17.26	23,204
Lexington	7.15	—	10,972
Lincoln	2.76	—	9,544
Littleton	3.33	—	11,345
Lynn	0.88	0.46	7,384
Lynnfield	6.56	—	6,776
Malden	—	—	3,252
Manchester	1.78	0.92	4,984
Marblehead	1.30	0.37	2,903
Marlborough	1.34	—	14,390
Marshfield	3.88	10.58	18,678
Maynard	3.29	—	3,396
Medfield	7.37	—	9,479
Medford	0.33	—	5,648
Medway	1.15	—	7,372
Melrose	0.23	—	3,036
Middleton	4.89	—	9,332
Milford	4.20	—	9,808
Millis	6.50	—	7,828
Milton	0.69	1.94	8,495
Nahant	1.62	—	737
Natick	1.84	—	9,992
Needham	4.25	—	8,194
Newton	1.10	—	11,252
Norfolk	3.06	—	10,159
No. Reading	4.91	—	8,680
Norwell	3.47	1.06	13,133
Norwood	4.68	—	6,610
Peabody	3.20	0.06	10,768
Pembroke	3.81	—	15,284
Quincy	0.61	4.47	10,752
Randolph	2.37	—	6,569
Reading	2.36	—	6,388
Revere	0.76	12.48	4,054
Rockland	2.60	—	6,421
Rockport	2.20	1.05	4,636
Salem	2.84	0.66	6,016
Saugus	1.72	9.35	7,320
Scituate	1.20	10.85	11,281
Sharon	1.39	—	15,432
Sherborn	3.60	—	10,084
Somerville	—	—	2,636
Southborough	3.02	—	9,844
Stoneham	1.26	—	4,332
Stoughton	2.12	—	10,492
Stow	3.19	—	11,672
Sudbury	7.48	—	15,676
Swampscott	1.73	—	1,956
Topsfield	9.24	—	8,188
Wakefield	3.32	—	5,112
Walpole	1.81	—	13,330
Waltham	2.71	—	8,812
Watertown	0.14	—	2,708
Wayland	11.34	—	10,168
Wellesley	1.41	—	6,580
Wenham	3.79	—	5,321
Weston	2.84	—	10,948
Westwood	1.27	—	7,118
Weymouth	1.14	1.44	11,528
Wilmington	3.58	—	11,076
Winchester	0.91	—	4,060
Winthrop	0.31	2.78	1,256
Woburn	3.64	—	8,275
Wrentham	2.22	—	14,447

Source: Study Element Number 3.05 of the Southeastern New England Study, 1973.

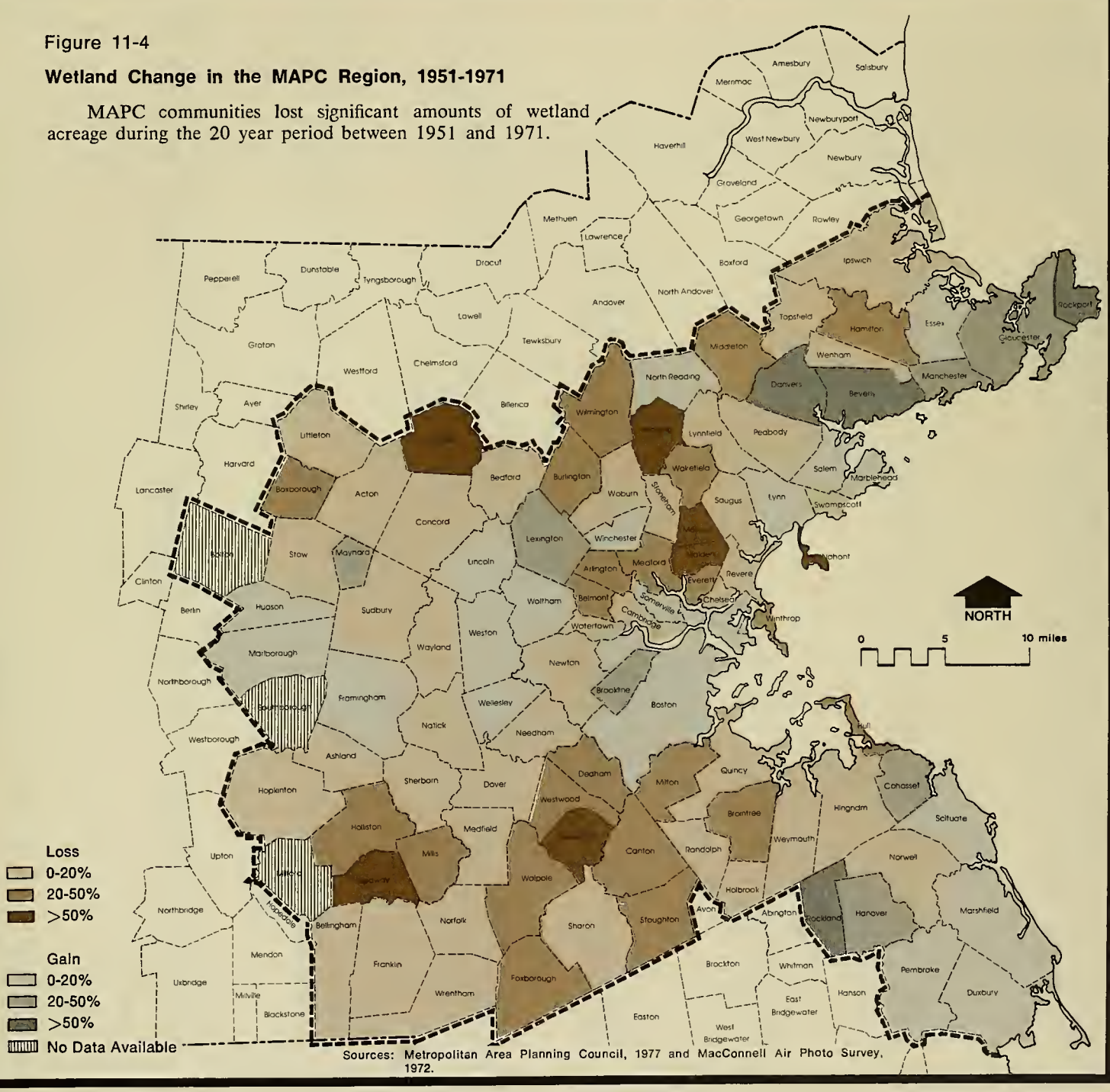
Note—vegetation associations are the determining factors for the percentage of wetlands indicated for each town. If floodplain information is used, the % of wetlands in each town will increase.

Note: Hopkinton—1.8 sq. miles of water, 1515 acres inland wetlands.

Figure 11-4

Wetland Change in the MAPC Region, 1951-1971

MAPC communities lost significant amounts of wetland acreage during the 20 year period between 1951 and 1971.



Sources: Metropolitan Area Planning Council, 1977 and MacConnell Air Photo Survey, 1972.

Table 11-10

Population Density in the MAPC Region in 1950, 1960 and 1970

A review of population density per square mile in MAPC communities in ten year increments, shows urbanized communities decreasing in density and suburban areas increasing. Density tracking points to an obvious population trend from the cities to the suburbs.

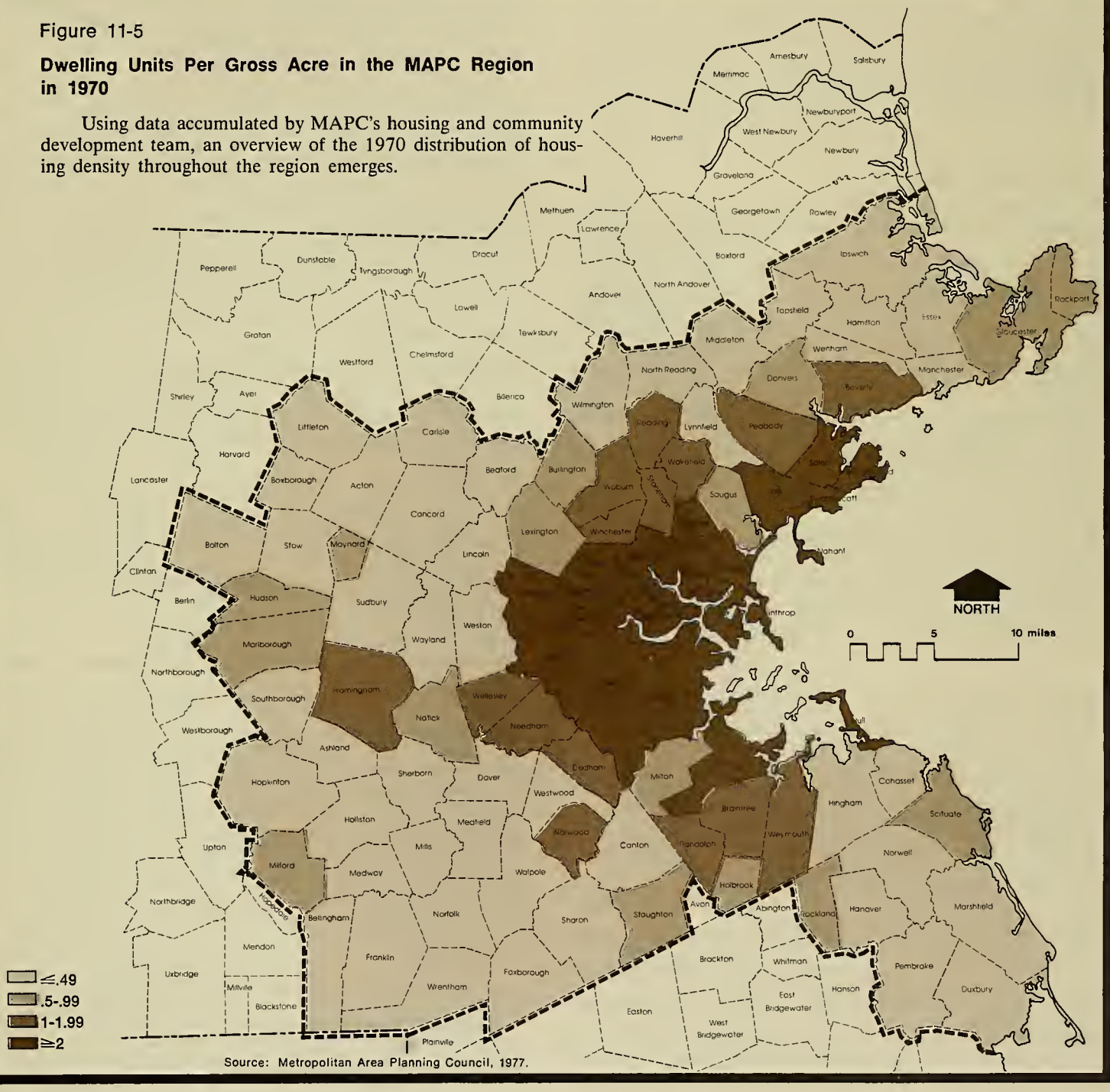
Community	Pop./Sq. Mi. 1950	Pop./Sq. Mi. 1960	Pop./Sq. Mi. 1970
Acton	174	359	732
Arlington	8,153	9,183	9,839
Ashland	272	604	690
Bedford	375	785	967
Bellingham	220	363	748
Belmont	5,991	6,283	6,192
Beverly	1,862	2,328	2,472
Bolton	*	63	95
Boston	16,416	14,281	13,131
Boxborough	42	71	139
Braintree	1,629	2,185	2,465
Brookline	8,457	7,931	8,647
Burlington	276	1,108	1,869
Cambridge	16,472	14,695	13,692
Canton	383	656	878
Carlisle	56	96	186
Chelsea	15,503	13,446	12,201
Cohasset	372	583	694
Concord	334	484	625
Danvers	1,152	1,606	1,916
Dedham	1,701	2,196	2,478
Dover	111	183	291
Duxbury	131	196	316
Essex	123	153	183
Everett	12,563	11,897	11,607
Foxborough	345	498	698
Framingham	1,067	1,691	2,433
Franklin	299	391	662
Gloucester	949	972	1,054
Hamilton	185	367	426
Hanover	217	380	648
Hingham	471	679	832
Holbrook	537	1,356	1,581
Holliston	197	327	634
Hopkinton	124	176	213
Hudson	684	805	1,340
Hull	1,215	2,538	3,583
Ipswich	190	236	296
Lexington	1,011	1,616	1,860
Lincoln	162	376	508
Littleton	129	280	349
Lynn	8,643	8,187	7,824
Lynnfield	371	793	1,022
Malden	11,772	11,354	11,049
Manchester	368	505	661
Marblehead	3,032	4,080	4,691
Marlborough	701	837	1,243
Marshfield	112	231	522
Maynard	1,314	1,449	1,829
Medfield	307	407	663
Medford	7,487	7,358	7,293
Medway	325	449	689
Melrose	5,694	6,249	7,000
Middleton	200	255	277
Milford	*	1,051	1,291
Millis	209	358	465
Milton	1,688	1,988	2,049
Nahant	2,330	3,443	3,582
Natick	1,271	1,847	1,990
Needham	1,274	2,015	2,324
Newton	4,664	5,255	5,180
Norfolk	170	219	293
North Reading	325	614	831
Norwell	123	254	381
Norwood	1,610	2,410	2,983
Peabody	1,346	1,915	2,858
Pembroke	108	206	469
Quincy	4,990	5,203	5,236
Randolph	973	1,842	2,635
Reading	1,403	1,930	2,258
Revere	5,808	6,332	6,818
Rockland	893	1,308	1,563
Rockport	584	638	778
Salem	4,455	4,171	4,314
Saugus	1,500	1,806	2,195
Scituate	340	636	936
Sharon	201	418	513
Sherborn	79	115	210
Somerville	24,842	22,985	21,548
Southborough	*	259	376
Stoneham	1,954	2,632	3,061
Stoughton	680	996	1,431
Stow	93	141	218
Sudbury	106	304	551
Swampscott	3,784	4,344	4,437
Topsfield	110	262	409
Wakefield	2,457	3,041	3,179
Walpole	437	675	871
Waltham	2,427	4,024	4,472
Watertown	8,825	9,242	9,292
Wayland	277	657	847
Wellesley	1,999	2,536	2,729
Wenham	198	337	463
Weston	294	483	635
Westwood	525	931	1,147
Weymouth	1,815	2,675	3,032
Wilmington	407	720	988
Winchester	2,446	3,056	3,512
Winthrop	9,947	10,359	10,375
Woburn	1,585	2,414	2,893
Wrentham	237	296	324

Source: U.S. Census, 1950, 1960, 1970.
* No data available.

Figure 11-5

Dwelling Units Per Gross Acre in the MAPC Region in 1970

Using data accumulated by MAPC's housing and community development team, an overview of the 1970 distribution of housing density throughout the region emerges.



Source: Metropolitan Area Planning Council, 1977.

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Volume IV Supplement: Open Space Law. October, 1972.
Massachusetts Open Space Plan. April, 1969.
Volume I Open Space and Recreational Plan and Program for Metropolitan Boston. April, 1969.
Volume III Open Space and Recreational Program for Metropolitan Boston: The Mystic, Charles and Neponset Rivers. April, 1969.
Volume II Open Space and Recreational Program for Metropolitan Boston: Boston Harbor. July, 1967.
Comprehensive Land Use Inventory Report. March, 1967.
* Contains useful maps.

Maps (in-house reference only)
Vacant Land Analysis (EMRPP Study) 65 Quads (scale: 1″ = 2000′)
MacConnell Land Use Sheets—MAPC area only (scale: 1″ = 2000′)
1971 Landscape Analysis (scale: 1″ = 3000′)
Community Zoning Information (scale: 1″ = 3000′)
Community Master Plans (scale: 1″ = 3000′)
1976 Regional Open Space System (scale: 1″ = 3000′)
Topographical Slope (scale: 1″ = 3000′)
General Soils (scale: 1″ = 3000′)
Wetlands (scale: 1″ = 3000′)
Public and Quasi-Public Lands (scale: 1″ = 3000′)
Landscape Analysis (scale: 1″ = 3000′)
Environmental Pattern I (scale: 1″ = 3000′)
De Facto Pattern (scale: 1″ = 3000′)
Maps (available upon request)
MDC Parks District (size: 8½″ x 11″)
1990 Land Use and Transportation (size: 17″ x 22″)
Parks District (size: 17″ x 22″)

Agency Contacts

Federal Flood Insurance Administration
U.S. Department of Housing and Urban Development
451 7th Street Southwest
Washington, D.C. 20410

Massachusetts Audubon Society
South Great Road
Lincoln, MA 01773

Massachusetts Department of Community Affairs
Office of Local Assistance
John W. McCormack Building
One Ashburton Place
Boston, MA 02108

Massachusetts Division of Conservation Services
Saltonstall Building
100 Cambridge Street
Boston, MA 02202

Massachusetts Fisheries, Wildlife and Recreational Vehicles Department
Saltonstall Building
100 Cambridge Street
Boston, MA 02202

Massachusetts Office of Coastal Zone Management
Saltonstall Building
100 Cambridge Street
Boston, MA 02202

Massachusetts Office of State Planning
John W. McCormack Building
One Ashburton Place
Boston, MA 02108

Metropolitan Area Planning Council
44 School Street
Boston, MA 02108

Trustees of Reservations
224 Adams Street
Milton, MA 02186

U.S. Department of Interior Fish and Wildlife Service
Northeast Region
1 Gateway Center
Newton Corner, MA 02158

APPENDIX A

Known Plans for Metropolitan Boston

Air Quality

Draft Proposed Plan for the Attainment and Short Term Maintenance of Massachusetts and National Ambient Air Quality Standards for SO_2 and Total Suspended Particulate Matter in the Commonwealth of Massachusetts (1976)
for: Governor, Cabinet
by: Executive Office of Environmental Affairs, Department of Environmental Quality Engineering, Division of Air and Hazardous Materials
endorsed by: Governor, Environmental Protection Agency
Boston Transportation Control Plan (1975)
for: General Public, Governor, Cabinet, Industry
by: Environmental Protection Agency
endorsed by: Governor, Environmental Protection Agency

Coastal Zone Management

Coastal Zone Management Plan, Volumes I and II (1977)
for: Governor, General Court, coastal communities
by: Executive Office of Environmental Affairs, Office of Coastal Zone Management

Disaster Preparation

Commonwealth of Massachusetts, State Comprehensive Emergency Response Plan (1976)
for: Commonwealth of Massachusetts
by: Massachusetts Civil Defense Agency, Office of Emergency Preparedness

Economic Development

Overall Economic Development Plan for Metropolitan Boston Area (1977)
for: 101 member communities
by: Metropolitan Area Planning Council
note: official certification document for region updated annually
Overall Economic Development Program (1977)
for: 101 member communities, Economic Development Administration
by: Boston, Chelsea, Quincy Consortium
Four Point Program for the Northeast (1977)
for: general public, business, political leaders
by: James Howell, First National Bank
1976 Revision to the Regional Development Plan (1976)
for: New England Governors
by: New England Regional Commission
An Economic Development Program for Massachusetts (1977)
for: Governor, Cabinet
by: Office of State Planning
Overall Economic Development Program (1976)
for: member communities, Economic Development Administration
by: South Essex Redevelopment Area
Travel and Tourism in Massachusetts, An Economic Analysis (1975)
for: Department of Commerce and Development
by: Norman Cournoyer & James K. Kindahl, University of Massachusetts, 1975
Manpower Requirements for Massachusetts, by Occupation, by Industry, 1970-1985 (1976)
for: general public
by: Division of Employment Security

Energy

Energy in Massachusetts, An Update of Energy Activities and Policies in the Commonwealth (1976)
for: Governor, Cabinet
by: Executive Office of Consumer Affairs, Energy Policy Office
A National Plan for Energy Research Development and Demonstration: Creating Energy Choices for the Future (1976)
for: general public
by: Energy Resources Development Administration
Natural Gas (1975)
for: Governor, Cabinet
by: Executive Office of Consumer Affairs, Energy Policy Office
Energy Conservation Program (1975)
for: Governor, Cabinet
by: Executive Office of Consumer Affairs, Energy Policy Office
Energy Conservation Guidelines for Cities and Towns in Massachusetts (1975)
for: Governor, Cabinet, cities and towns
by: Executive Office of Consumer Affairs, Energy Policy Office, Department of Community Affairs

Health

Draft Health Systems Plan (1977)
for: Department of Health, Education and Welfare, Massachusetts Department of Public Health
by: North Shore Health Planning Council
Draft Health Systems Plan (1977)
for: Department of Health, Education and Welfare, Massachusetts Department of Public Health
by: Health Planning Council of Greater Boston
Draft Health Systems Plan (1977)
for: Department of Health, Education and Welfare, Massachusetts Department of Public Health
by: Southeastern Massachusetts Health Planning and Development, Inc.
note: Other human service plan listings are incomplete at this point and the reader is urged to contact the appropriate human service agency

Housing

Low and Moderate Income Housing Needs in the Boston Region (1974)
for: 101 member communities
by: Metropolitan Area Planning Council
Report on Housing Needs and Programs (1974)
for: Governor, General Court
by: Department of Community Development
note: Regional HOP (Housing Opportunity Plan) for Metropolitan Boston, the official certification document, will be prepared by MAPC in 1978.

Human Services

Program and Financial Plan, Fiscal Year 1978, Massachusetts Rehabilitation Commission.
State Plan for the Provision of Services and Facilities for Persons with Developmental Disabilities, Fiscal Year 1978, Massachusetts Developmental Disabilities Council.
Comprehensive Annual Social Services Plan (Title XX) for fiscal Year 1978; (Final) Massachusetts Department of Public Welfare, May 1977.
The Five-Year State Plan for Mental Health Services, 1977; Massachusetts Department of Mental Health.
Health Data Annual, 1977, Office of Health Statistics, Massachusetts Department of Public Health.

Land Use

The Massachusetts Land Use Element, Summary Statement, 1978
for: Governor U.S. Department of Housing and Urban Development
by: Office of State Planning
Plan For Land Use in Metropolitan Boston, 1978 (Plumb)
for: Technical Advisory Committees on Comprehensive Planning and Land Use
by: Metropolitan Area Planning Council Staff
Note: Not an official Council Document. Prepared for adoption by Council in April 1978
City and Town Centers—A Program for Growth: The Massachusetts Growth Policy Report (1977)
for: Governor, Special Commission on the Effects of Growth Patterns on the Quality of life in the Commonwealth, the General Court, general public
by: Office of State Planning
Planning for the Future: Alternatives to the Trend, 1977
for: MAPC membership, general public
by: Metropolitan Area Planning Council
A Policy for Food and Agriculture: Issues and Programs, 1975
for: Governor, the general public
by: Secretary of Environmental Affairs and Mass. Department of Food and Agriculture

Parks and Open Space

Boston Urban Study (1977)
for: general public
by: Bureau of Outdoor Recreation
State Comprehensive Outdoor Recreation Plan (SCORP) (1976)
for: Governor, General Court, general public
by: Department of Environmental Management
MAPC River Systems Study (1976)
for: 101 member communities
by: Metropolitan Area Planning Council
MAPC Open Space Plan (1976)
for: 101 member communities
by: Metropolitan Area Planning Council
endorsed by: Metropolitan Area Planning Council
Olmstead Park Study (1973)
for: Boston Redevelopment Authority
by: Metropolitan Area Planning Council
Boston Harbor Islands Study (1972)
for: 101 member communities
by: Metropolitan Area Planning Council
Metropolitan District Commission Parks Master Plan (1956)
for: Metropolitan District Commission

Regional Fire Service

A Program for the Development of a Master Plan for a Regional Fire Service Alarm, Dispatch and Communications Center (1975)
for: Massachusetts Civil Defense District #13
by: Metropolitan Area Planning Council & National Fire Protection Association
endorsed by: MAPC on behalf of the 25 communities involved plus the MassPort Authority

Solid Waste

Commonwealth of Massachusetts State Solid Waste Plan (1977)
for: Governor
by: Resource Conservation and Recovery Act Task Force
Technical and Economic Information Relating to the RESCO Refuse to Energy Facility and the Refuse Disposal Requirements of Nine Communities (May 1974)
for: Metropolitan Area Planning Council
by: MITRE Corporation
Norfolk County Comprehensive Solid Waste Management Study (December 1973)
for: Norfolk County Commissioners
by: Camp, Dresser & McKee
A Systems Evaluation of Alternative Statewide Resource Recovery Techniques for the Disposal of Municipal Solid Waste (December 1973)
for: Massachusetts Department of Public Works
by: Arthur D. Little, Inc.
Commonwealth of Massachusetts Solid Waste Management Plan (July 1973)
for: Governor's Council on Solid Waste
by: Solid Waste Planning Unit
Solid Waste Management Study Report (May 1972) Vol I-IV
for: Bureau of Solid Waste Disposal, Department of Public Works
by: Raytheon Company
Solid Waste Disposal Program for Metropolitan Boston (1967)
for: 101 member communities
by: Metropolitan Area Planning Council

Transportation

Transportation Systems Management Elements of the Transportation Plan and Program for the Boston Region (1977)
for: same as above
by: Central Transportation Planning Staff
1977 Revised Program for Mass Transportation (1977)—DRAFT
for: MBTA Advisory Board
by: EOTC
note: to be endorsed by: 79 chief elected officials (MBTA Advisory Board)
Transportation Improvement Program for the Boston Region (1977)
(official certification document for metropolitan Boston, updated annually).
for: EOTC, MAPC, MDPW, MBTA, Advisory Board to the MBTA, JRTC
by: Central Transportation Planning Staff
endorsed by: Metropolitan Planning Organization made up of six agencies
(1) 79 chief elected officials (MBTA Advisory Board)
(2) 101 chief elected officials (MAPC) and 32 other council members
(3-6) EOTC, MDPW, MBTA
Transportation Plan and Program for the Boston Region 1975-1995 (1975)
(official certification document for metropolitan Boston, updated annually)..
for: EOTC, MAPC, MDPW, MBTA, Advisory Board to the MBTA, JRTC
by: Central Transportation Planning Staff
endorsed by: MPO

Water Quality and Supply

Preliminary Water Quality Project Reports and Addenda (by River Basin) (1977-1978)
for: municipal officials and citizens of 92 cities and towns in Metropolitan Area Planning Council Region
by: MAPC 208 Water Quality Staff
note: Areawide Waste Treatment Management Plan will be published in spring 1978 as the official certification document for the region to be updated periodically. It will be certified as endorsed by MAPC, chief elected officials, the Governor and the Environmental Protection Agency

Massachusetts Water Supply Policy Study (January 1977)
for: Commonwealth of Massachusetts
by: Wallace, Floyd, Ellenzweig, Moore; Arthur D. Little, Inc.
endorsed by: Executive Office of Environmental Affairs

Wastewater Engineering and Management Plan for Boston Harbor—Eastern Massachusetts Metropolitan Area—EMMA Study (1976)
for: Metropolitan District Commission, Army Corps of Engineers
by: Metcalf and Eddy, principal consultant
endorsed by: Metropolitan District Commission

Southeastern New England Land and Water-Related Resource Study (May 1975)
for: general public
by: New England River Basins Commission

Northeastern United States Water Supply Study (November 1975)
for: general public
by: Army Corps of Engineers

Water Quality Management for the North South Rivers Basin (1975-76)
for: general public
by: Division of Water Pollution Control, Department of Environmental Quality Engineering
endorsed by: Environmental Protection Agency, Division of Water Pollution Control

Water Quality Management for the North Coastal Streams Basin (1976)
for: general public
by: Division of Water Pollution Control, Department of Environmental Quality Engineering
endorsed by: Environmental Protection Agency, Division of Water Pollution Control

Water Quality Management for the Ipswich/Parker Rivers Basin (1976)
for: general public
by: Division of Water Pollution Control, Department of Environmental Quality Engineering
endorsed by: Environmental Protection Agency, Division of Water Pollution Control

Water Quality Management for the Charles River Basin (1976)
for: general public
by: Division of Water Pollution Control, Department of Environmental Quality Engineering
endorsed by: Environmental Protection Agency, Division of Water Pollution Control

Water Quality Management for the SuAsCo Rivers Basin (1976)
for: general public
by: Division of Water Pollution Control, Department of Environmental Quality Engineering
endorsed by: Environmental Protection Agency, Division of Water Pollution Control

APPENDIX B

Regional Planning and Operational Entities in the Boston Metropolitan Area in 1977

Metropolitan and Regional Entities	Number of Member Municipalities MAPC	Non-MAPC	Total
Counties			
Essex	19	15	34
Middlesex	40	14	54
Norfolk	26	2	28
Plymouth	9	18	27
Suffolk	4	0	4
Worcester	3	57	60
Regional Planning Districts[1]			
Metropolitan Area Planning Council	101	0	101
Essex County Historic & Scenic Planning District	12	7	19
Old Colony Planning Council	1	10	11
Park and Recreational Districts and Agencies			
Metropolitan District Commission Park District[2]	37	0	37
Park System, State Dept. of Environmental Management	65	250	315
Water Supply Districts[3]			
Metropolitan District Commission Water District	33	0	33
Salem-Beverly Water Supply District	2	0	2
Sewerage and Waste Disposal Districts			
Metropolitan District Commission Sewerage District	43	0	43
Metropolitan District Commission Refuse Disposal District	17	0	17
South Essex Sewerage District	5	0	5
South Essex Solid Waste Disposal District	14	0	14
Upper Assabet Valley Regional Refuse Disposal District	4	6	10
Transportation Districts and Agencies			
Massachusetts Bay Transportation Authority	79	0	79
Boston Metropolitan District Trustees	14	0	14
Cape Ann Regional Transportation Authority	2	0	2
Health and Environmental Protection Districts[4]			
Nashoba Regional Health District	3	13	16
Metropolitan Air Pollution	93	9	102
Merrimack Valley Air Pollution Control District	2	26	28
Southeastern Mass. Air Pollution Control District	6	54	60
Ipswich River Watershed District	18	4	22
Essex Conservation District	19	15	34
Middlesex Conservation District	40	14	54
Norfolk Conservation District	26	2	28
Northeast Worcester Conservation District	1	14	15
Plymouth Conservation District	9	18	27
Southern Worcester Conservation District	2	26	28
Central Mass. Mosquito Control District	14	18	32
Eastern Middlesex Mosquito Control District	16	0	16
Essex County Mosquito Control District	15	8	23
Norfolk County Mosquito Control District	20	2	22
Plymouth County Mosquito Control District	2	17	19
South Shore Mosquito Control District	10	0	10
Suffolk County Mosquito Control District	2	0	2
Regional Vocation Technical School Districts			
Assabet Valley Regional Voc. Tech. School District	4	3	7
Blackstone Valley Regional Voc. Tech. School District	2	11	13
Blue Hills Regional Voc. Tech. School District	6	1	7
Minuteman Regional Voc. Tech. School District	12	0	12
Nashoba Valley Regional Voc. Tech. School District	1	3	4
Northeast Metropolitan Regional Voc. Tech. School District	12	0	12
North Shore Regional Voc. Tech. School District	14	1	15
Shawsheen Regional Voc. Tech. School District	3	2	5
Southeastern Regional Voc. Tech. School District	3	6	9
South Middlesex Regional Voc. Tech. School District	4	0	4
South Shore Regional Voc. Tech. School District	5	1	6
Tri-County Regional Voc. Tech. School District	7	2	9
Whittier Regional Voc. Tech. School District	1	10	11
Academic Regional School Districts			
Acton-Boxborough Regional School District	2	0	2
Concord-Carlisle Regional School District	2	0	2
Dover-Sherborn Regional School District	2	0	2
Hamilton-Wenham Regional School District	2	0	2
King Philip Regional School District	2	1	3
Lincoln-Sudbury Regional School District	2	0	2
Masconomet Regional School District	2	1	3
Nashoba Regional School District	2	1	3
Northborough-Southborough Regional School District	1	1	2
Silver Lake Regional School District	1	3	4

Source: Legislative Research Council. Report Relative to Establishing a Metropolitan Services Financing District in the Boston Metropolitan Area. 1976 (Advance Draft).

[1] In addition to regional planning and historic districts, within the 101-municipality MAPC area there are a total of 39 intramunicipal historic districts.

[2] The Town of Cohasset belongs to both the MDC Park District and the park system of the State Department of Environmental Management, resulting in "double counting" of that town in this table.

[3] In addition to regional water supply districts, there are within the 101-municipality MAPC area these five intramunicipal water or fire and water districts: Acton, Kalmia Woods-Concord, Lynnfield Center, and Sudbury.

[4] The General Laws (c. 252) provide for the establishment of reclamation districts. However, no such districts now exist.

Credits

Data Collection

MAPC's technical staff, including:
Len Bogorad—housing, food
Tom Callaghan—taxes
Robert Catineau—land use
John Connery—land use
Anthony DiSarcina—transportation
Terrence Geoghegan—land use, energy, people
John Henry—solid waste
Ashraf Jan—transportation, air and noise
Dave Knight—economics
Tom Kussy—economics
Joseph McGinn—water quality
Mike Oman—data coordination
Ron Patton—economics
Tom Pelham—air and noise, energy
Ralph Rusin—housing
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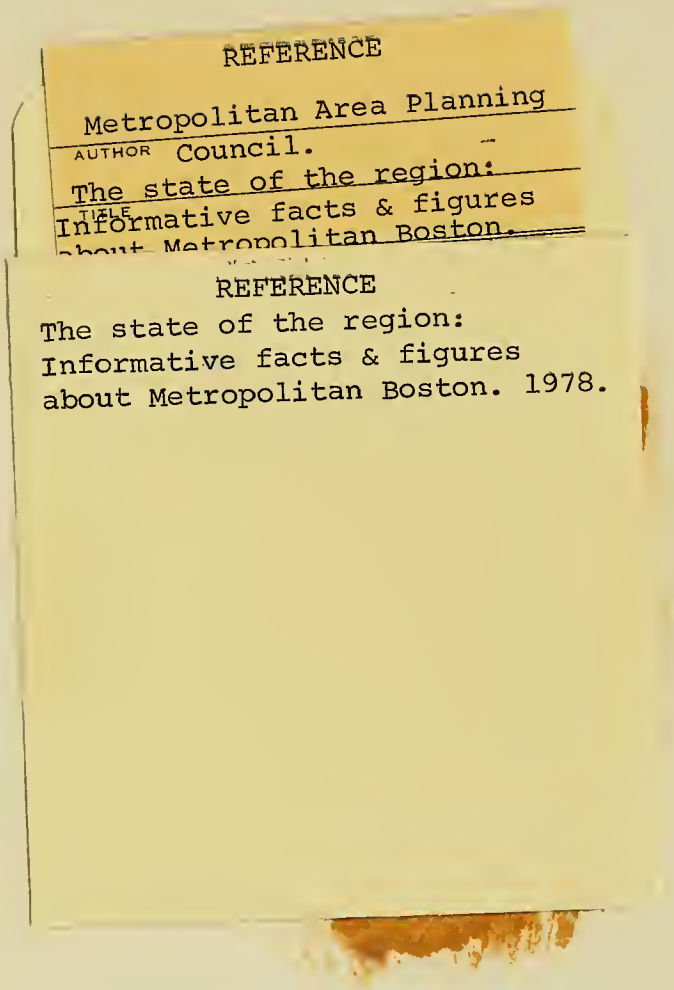
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